

# THE IRON AGE

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## Modern Methods of Making Leaf Springs

Continuous Process for Automobile Springs—Preparing the Plates—Automatic Hardening—Forming and Quenching Machines

BY E. F. LAKE\*

IN the past ten years many radical changes have been developed in the methods and apparatus used for manufacturing leaf springs used on vehicles of all kinds. This is another instance where the automobile has been the instigator of changes that have revolutionized old methods owing to its demand for large quantities of higher grade materials than were needed for other kinds of vehicles.

The American Autoparts Co. recently built a new plant on a 30-acre plot in Detroit and made it the largest plant in the country devoted exclusively to the manufacture of leaf springs and automobile springs in particular. Under the guidance of its president, W. E. Perrine, the continuous process was installed and the improved spring making machines, furnaces and appliances that comprise this process would almost enable one to say that the entire plant is one large automatic machine. To fully appreciate the change it is necessary to compare this process with the methods in general use less than 10 years ago and still found in a few places.

It is of the utmost importance in the manufacture

of any spring to have accurate and definite temperatures at which to harden and draw them, but this was impossible with former methods; the hardening and tempering was largely a matter of guesswork. Then the spring formers would heat the spring leaves or plates in oven furnaces that were held at temperatures between 1700 and 1800 deg. Fahr., or from 200 to 300 deg. above the transformation point of the steel. I have frequently recorded fires that showed over 1900 deg. on the pyrometer. The formers controlled their own furnaces and were always tempted to overheat the steel as the forming was piece work and the hotter the steel, the easier and quicker could it be bent to shape.

From such furnaces the main plate was first pulled and bent over a form by two men who worked on opposite sides, started at the center and pinched it down to the form every few inches until the end was reached and then formed the other end in the same way. This plate was then quenched in oil and called hardened. After that this spring plate was taken from the oil and put back in the same high temperature furnace until the oil burned off and that was called tempering. It is to be regretted that such methods

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Fig. 1—Steel Stock Room of the American Autoparts Co., Detroit. Here the bars are cut into lengths for the various sized springs

are still in existence but they are rapidly disappearing. The other spring plates were built up on the main plate and hardened and tempered in the same manner.

The spring formers depended on their skill to remove the plates from the furnace when they reached a temperature that would allow them to cool down to the transformation point during the forming operations and thus be quenched in the oil at the correct heat. They also depended on their skill to burn the oil off in a furnace with a temperature above 1700 deg. and get a drawing temperature of some 750 deg. As the time consumed in forming spring plates varied with different men and with different sizes of plates, their quenching temperature would have a wide variation. Frequently this fell below the transformation point and resulted in soft springs. Under the best of conditions furnace temperatures had to be kept 200 deg. above the transformation point to allow for the cool

and that meant extra work in peening them back to the shape the formers left them in, so they would properly fit the other leaves in the spring. Hardening and drawing temperatures could be controlled more accurately in this way and better springs were the result, but the additional cost kept this method of spring making from becoming very popular or desirable.

Under the old method the spring plates would warp some while being quenched in the oil and when being heated to the drawing temperature, but not as much as when the cold plate was heated a second time to the hardening temperature. Both the spring formers and spring fitters that did this peening, were highly skilled men that had to be highly paid for this hand work.

#### Benefits of New Method

The continuous process installed by the American Autoparts Co., with the improved machinery, furnaces

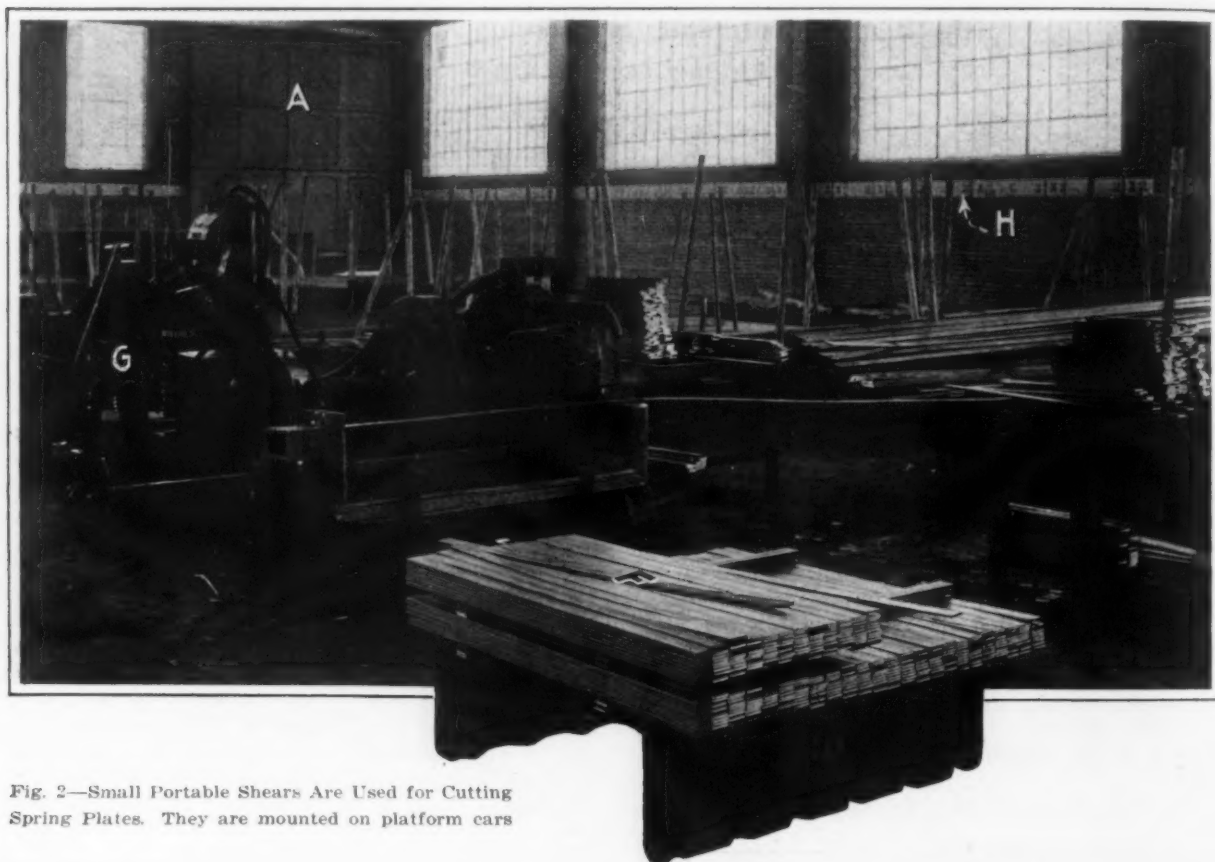


Fig. 2—Small Portable Shears Are Used for Cutting Spring Plates. They are mounted on platform cars

down during the forming operations and more often it was 300 deg.

Every degree steel is heated above the transformation point adds to the coarseness of the grain and 300 deg. might result in a crystallized grain that is very weak. Thus the fine grain that is obtained at the transformation point and that is needed for the fatigue resistance of springs could not be retained in the steel. In commercial work on a piece-work basis, it is impossible to burn the oil off of steel in a furnace operating at 1700 deg. or over and get a drawing temperature of 750 deg. Therefore, accurate heat treatment was an unknown quantity and many springs sagged from being too soft, while others broke from being too hard, brittle or crystalline. Scaling also went to the extreme in this method of spring making.

By 1913 some producers began to separate and make different operations of the forming, hardening and tempering. But this meant extra furnaces and a second heating of the steel for the hardening operation. It also meant extra handling of the spring plates and additional skilled and unskilled labor. Then the plates would warp on this second heating for hardening

and other apparatus, has so completely changed the above methods that skilled labor has been thrown in the discard and better springs are being made than the highly skilled hand labor thought was possible. The heat treating is accurately done at predetermined temperatures and on scientific principles. Warpage has been overcome to an extent that only about 15 per cent of the springs go to hand fitters to be touched up and these need not be highly skilled, even though inspection be more rigid than formerly. Scaling has been reduced to almost nothing and along with this great accuracy, the cost of production has been greatly reduced.

First comes the 100 x 250 ft. steel room shown by Fig. 1. The steel enters the plant through door A, in railroad cars that run along that side of the building for its entire length. A 50-ton car of steel can be unloaded in from 20 to 30 min. by the 5-ton overhead crane that is shown carrying one bundle of steel bars at B. The different grades and sizes of steel are kept separate by steel posts which stand in iron sockets flush with the floor and located every 12 in. Two Toledo Machine & Tool Co., motor-driven punch presses

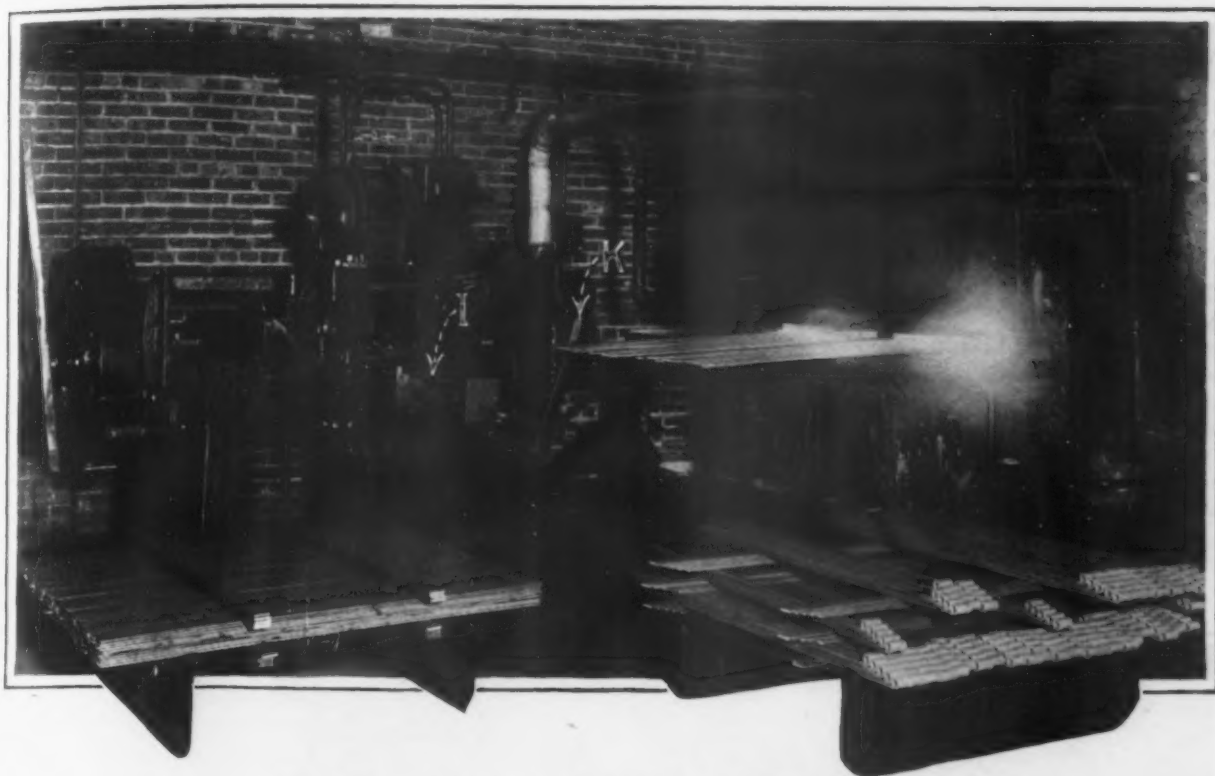


Fig. 3—Forming the Eyes by Means of a Single-Stroke Machine

can be seen in the middle of the floor as they are rigged up for cutting bars into spring plate lengths. They are made portable by the traveling crane and can be moved to the steel pile or have steel bundles moved to them. The power current for such tools can be plugged under covers C, which are spaced every 10 ft. When the steel is cut into spring plate lengths it goes through doorway, E, to other departments. Plates, D, cover a hot air duct that heats the building by forced draft and can be opened at any point.

In Fig. 2 are shown two motor-driven shears that are mounted on platform cars to make them portable. They plug into the C holes shown in Fig. 1 and cut

smaller stock than the punch presses. The cut plates are stacked, as at F, on platforms of Baker R & L elevating trucks, G. Several of these are moved in a train by electric floor trucks. This system of moving stock is used throughout the plant. At the other end of the plant the finished springs are loaded into freight cars in that way. Steel piles are marked on band, H, which runs all around the room.

#### Main Building

The main building starts at doorway E (Fig. 1), and is 250 x 360 ft. The first 30 ft. is partitioned off along this wall for a distance of 110 ft. for what



Fig. 4—The Loading End of the Automatic Hardening Furnace

mechanical work has to be done to spring plates before they are fitted together, heat treated and assembled. This includes eye forming, bolt hole punching, beveling and chamfering ends, nibbing, or any special operations that designers may specify. All departments in this main building are separated by 8-ft. wire fencing such as separates the assembling tables in Fig. 10.

Beyond this 30 ft. are located four units of the continuous process which do the real important part of the work on springs. The shop was designed for eight units and the other four will be installed as soon as business conditions warrant. Through this remaining 220 ft., straight over from doorway, E, to the opposite side of the building, the work travels, without a stop, through a hardening furnace, forming machine, oil quenching tank, conveyor, tempering furnace, over a conveyor assembling table and over the shipping platform into freight cars that run just inside this wall of the building.

In Fig. 3 is shown one of the six units that form the eyes on the main plate. The hot plate is inserted in the machine as at I and lever K is pulled over. In

can be seen to the right. Four large lots of springs can be worked through the shop at the same time in these units. Small orders are handled in a different way and several lots can be worked through at one time, but a more expensive method has to be used.

One unit was working on Ford rear springs and these were chosen to illustrate the possibilities of this process, as the hump makes the plates more difficult to fit together than in springs of simpler shapes. Two boys are kept busy loading this furnace by placing the spring plates on rails, J, Fig. 4, which are continually in motion. They raise to the position shown, travel forward a few inches, then lower into the slots under them and travel back, leaving the work on the hearth of the furnace for a short time. The continual repetition of this forward stroke gradually moves the work to the far end of the furnace, where it gets the correct hardening temperature and is pulled out to be formed into shape and quenched in oil.

The far end of this furnace is maintained at a temperature just above the transformation point of the steel, while the loading end is held at a lower tempera-

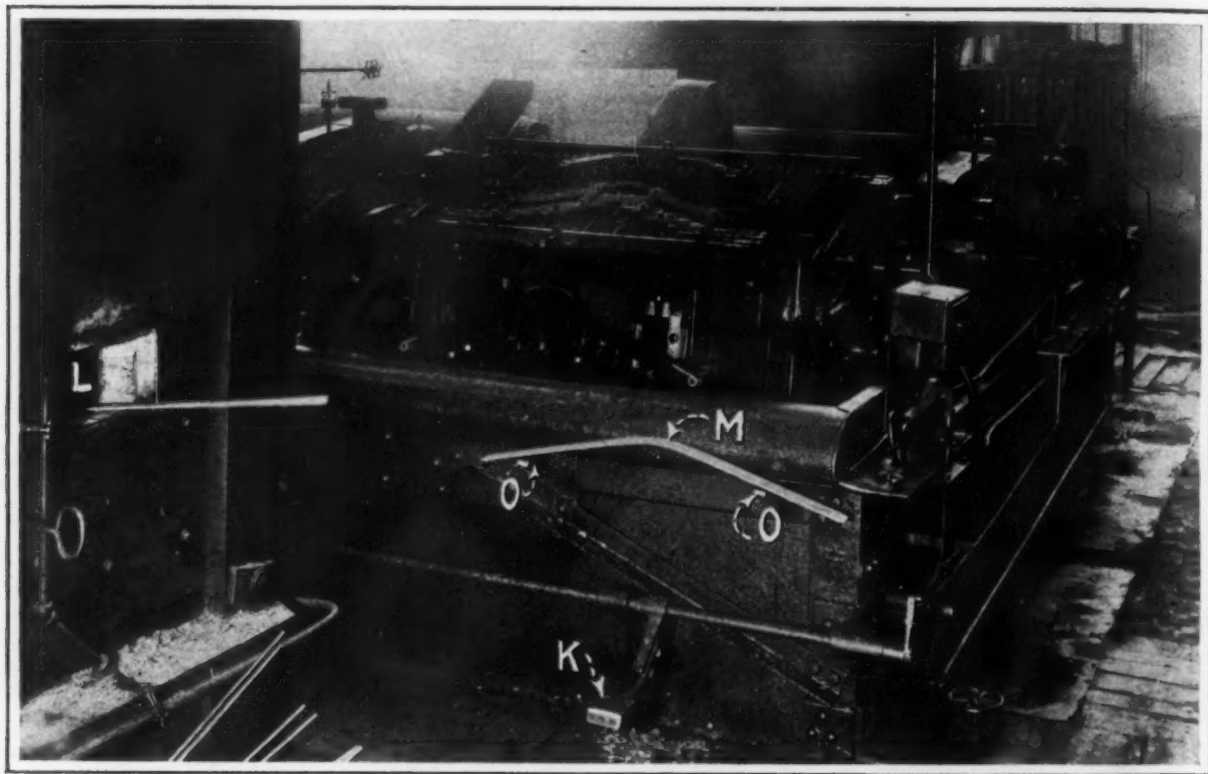


Fig. 5—The Forming and Quenching Machine Which Takes the Plates from the Hardening Furnaces at the Left

a single stroke, this machine then forms the perfect eyes shown on the truck platform. They must be heated again to form the eye on the other end. Formerly it took three strokes of a machine to roll the eye to a perfect round and press the end into close contact with the plate and many such machines are still used. With this three-stroke machine 2500 eyes is about the best that can be turned in a 9-hr. day, but with this improved machine 4000 eyes is considered a good day's work.

All the furnaces for minor operations are located along this wall, while the machines for drilling, beveling, chamfering, nibbing, etc., are on the opposite side of the gangway.

#### Continuous Units

In Fig. 4 is shown the loading end of the intermittent type of automatic furnace, used for heating spring plates for the forming and hardening operations. It is here that the work is started through the continuous unit, and the most important part of modern spring making begins. The side of a furnace of another unit

ture. Recording chart pyrometers and temperature control instruments maintain a uniform temperature throughout the day so the plates will all have the same degree of hardness and the grain structure of the steel will be held in its finest condition.

On test runs this temperature does not vary 10 deg. The oven of this furnace is not high but it is 6 ft. wide and 16 ft. long. To maintain a 10-deg. limit all day, the quantity of steel being heated must not vary; the air and oil pumps must keep up a given number of r.p.m.'s; the fuel must hold to a definite number of heat units; nothing can clog the burners for an instant; etc. Thus so many factors have to be uniform all day that commercial work is never kept within this 10 deg. no matter how many assert that it is done. No one would think of raising an objection if hardening temperatures were kept within a 25-deg. limit, just above the critical range, and ordinary shop regulation will do that in this furnace. The discharge end is inclosed by the furnace wall, except for small 12 x 18 openings (Fig. 5) on each side, through which to pull the work. There being no end doors to open

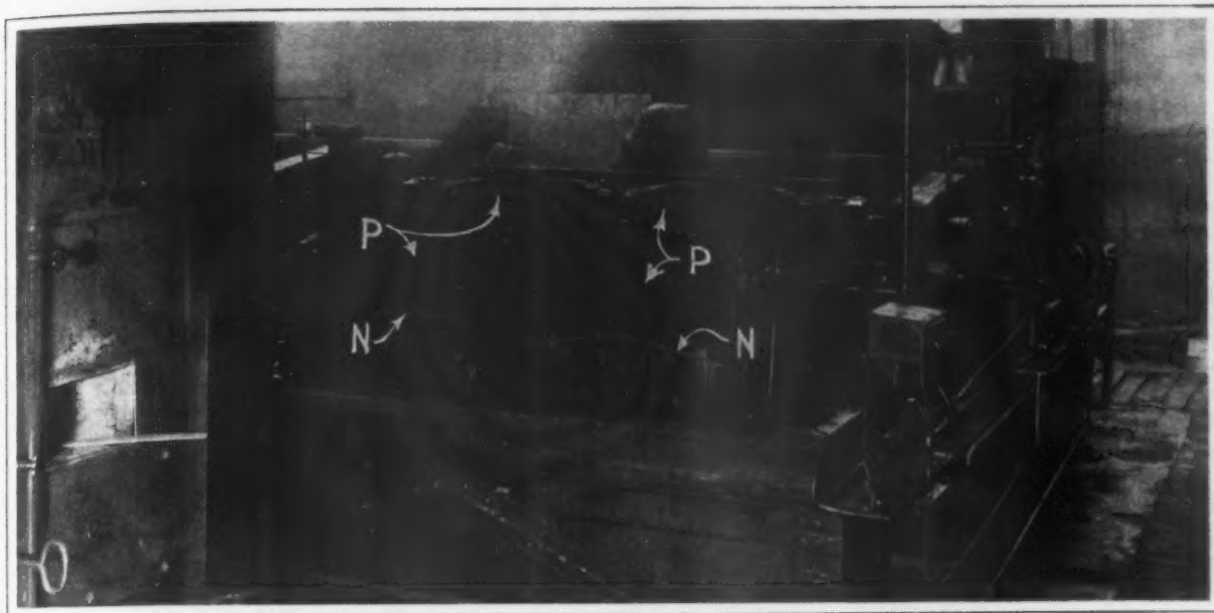


Fig. 6—The Forming Machines Are So Constructed That Two Plates for Small Springs Can Be Formed at the Same Time

and close and lower the heat in the furnace, the greatest cause of variable temperatures is removed. This makes it easy to maintain an accurate and uniform temperature and also prevent scale.

The conveyor is timed so plates consume 25 min. in traveling through the 16 ft. of this furnace. Thus 15 or 20 min. of this can be used for slowly heating them up to the transformation point and 5 or 10 min. for a soaking at that heat; if the furnace is kept at the hardening temperature at the discharge end this gradually dies down to a low heat at the entrance. This accomplishes preheating in a scientific manner and the only addition to cost is a few feet more in length of furnace. The benefits derived from preheating have been common knowledge for a long time but spring makers could not use it with old methods of manufacture as it added another operation and furnace and increased costs already too high.

#### Forming and Quenching

In Fig. 5 is shown how the plates are taken from the hardening furnace to be pressed into shape in the forming machine and quenched in the oil tank that forms its base. Another forming machine is located to the left of this one and its side can just be seen back of the furnace. It is fed from the opposite side

of this same furnace. Conveyors pull the plates from both quenching tanks and convey them to one tempering furnace that can be seen in the background to the right. A continuous conveyor assembling table is beyond this furnace. The complete unit, from hardening furnace to assembling table, inclusive, occupies a floor space 25 ft. wide and 155 ft. long. Beyond that is the shipping platform and freight car track.

Two men work together in operating this forming machine. It is of the revolving type with six sides for plates and capacity enough for an 8-plate spring, with a main plate over 7 ft. long. The machine stands in the position shown until the first man has located the main plate and stepped on pedal K, Fig. 5. This causes the machine to clamp the plate, as shown, and revolve enough to lower it into the oil quench, and stop with the second plate form in this same position. While that is being done, the second man has pulled the second plate from furnace opening, L, with tongs, bent it to shape, M, by a pull up between projecting bars, O O, and is ready to place it in the next forming clamp and step on pedal K. In the mean time, the first man has come back for the third plate. Thus they work in circles as long as the furnace feeds them plates.

As the upper plates get shorter, two can be located



Fig. 7—Where the Clamps Are Made Ready for the Forming Machine. The eight plates which make up a Ford spring are in the foreground

in one section of the machine, as shown at N N in Fig. 6. When the clamps close on these plates they will be shaped like formers P P.

Sometimes the bottom of the clamp is a solid iron casting that can only be used on one particular plate. Sometimes it is a thin flat steel bar that is held in shape by bolts and can be changed to shapes that fit other plates. The top of the clamp is always of the latter kind as that will give enough to prevent the machine from breaking if one plate should happen to be a little thicker than others. If both top and bottom were solid, allowance would have to be made for a variation in thickness of plates and they could not be made to fit together so well. With the methods used, this hump spring is assembled just as plates come from this machine and about 85 per cent pass a rigid inspection for fit. Only 15 per cent have warped enough to need a re-fitting by hand peening. Sometimes the plates only need turning end for end to make them fit.

It takes less than half a minute to get each plate from the furnace, into the clamps and into the oil quench. Thus the steel hardly has time to cool down

through the critical range. This quick work allows the heat in the furnace to be held at a temperature that will just heat the steel past the upper critical point. Then all instruments and valves can be set so the furnace temperature will not rise more than 25 deg. above this transformation point, as that will allow for any variation during a day's run. With such a system overheating becomes a thing of the past and long spring plates can be hardened, in commercial quantities, at as accurate predetermined temperatures as can gears or any other steel part.

In Fig. 7 can be seen the shape of the eight plates that make up this Ford spring, just after they had passed through the furnace, forming machine and oil quench. On the floor are clamps that are used in this machine on other springs, while at Q is one that is being adjusted to shape a spring plate on the next job. Rods, which are threaded their whole length, are used for bolts. To get the correct shape for a spring plate it is only necessary to screw these in the right distance and lock them with a top and bottom nut.

(To be concluded)

## STANDARD FREIGHT CARS

### Recommendations to Be Made by Joint Congressional Commission

WASHINGTON, May 9.—In its forthcoming report to Congress, the Joint Commission of Agricultural Inquiry, will recommend complete standardization of freight cars and central control of distribution of all classes of rolling stock. Another set of recommendations will have reference to the railroad labor situation.

The recommendation as to standardization of cars is to be made as one of the suggested remedies for the constantly recurring shortage evil. Chairman Sydney Anderson, in outlining this part of the report, said that the commission has found that the number of locomotives operating and owned by some railroads is inadequate to meet the need during business activity and it should be augmented; that the supply of box cars, coal cars, stock cars, and refrigerator cars is inadequate to meet the demand during normal periods of activity and should be rapidly augmented.

Pointing out that failure to supply cars in adequate numbers during any considerable period usually results in an inflation of prices, Mr. Anderson says:

"The commission has therefore concluded to recommend to Congress complete standardization of all freight car equipment except with respect to cubical and weight carrying capacity in order to reduce initial cost, reduce the number of necessary repair parts, facilitate the repair of cars, to make possible economies in maintenance of freight equipment and to reduce unnecessary empty car mileage."

The report will show that the number of freight cars owned and operated by the railroads has increased 6.7 per cent over 1911. The aggregate capacity has increased 18.2 per cent and the net ton mileage for 1920 showed an increase of 62.4 per cent over 1911, the traffic handled during 1920 being greater than any previous year.

The commission, according to the chairman, will recommend to Congress as a further remedy for car shortage, prompt consideration and adoption of a comprehensive plan for central control and distribution of freight cars: (a) To meet currently and in full the requirements of shippers in each and every section of the country, (b) To eliminate all empty-car mileage except that made necessary to protect originating territory, (c) To meet demands in originating territory by balancing movement of loaded and empty cars.

The report will state that it is clearly apparent that with respect to freight car control and distribution, and the co-ordination and unification of terminal facilities, the carriers have not progressed, and it is declared that as to adequate car supply, all lines of

transportation must be placed upon the same basis and the problem treated in its nation-wide application. Some plan, it is stated, should be devised, which will aid the weaker lines by enabling them to purchase and properly maintain sufficient equipment to supply the present needs of shippers, together with a margin to meet a normal development of business activity. It is declared that the commission has found that the American Railway Association, whose car service division is empowered to relocate equipment between railroads, is not fitted to prevent emergency conditions and that any plan which may be adopted for the handling of equipment must contemplate current relocation of empty cars.

Further recommendations to Congress will be made as follows:

That the railroads and shippers co-operate to secure the full utilization of the carrying capacity of cars wherever possible; that permanent joint railroad and shippers' committees be organized to carry on a nation-wide campaign to reduce loss and damage to goods in transit; that freight-revenue divisions should be promptly revised to the basis of two-figure percentages; that regional clearing houses be established for the current settlement of debits and credits growing out of rate divisions; that the railroads should adopt universal through waybilling of interline freight; that the railroads maintain complete cost data covering each item of expense with particular reference to the maintenance of equipment; that the railroads adopt better systems for checking the extent and value of repairs to equipment when made by lines other than the line owning the car.

The commission has found that the number of cars in bad order exceeds all previous records and unless bad order cars are promptly repaired the supply will be materially impaired; also that a large proportion of the cars being used in interline movement are box cars and should be made fit for bulk grain loading; and all other classes of freight equipment should be promptly made suitable for all requirements, including general interchange throughout the country.

### Labor Situation

In dealing with the railroad labor situation, the report expresses the belief that in the settlement of ordinary disputes as to wages or working conditions, the carriers and their employees stand upon an equal footing and their disagreements should be settled by the ordinary process of adjustment applying in other industries.

This statement is made following a discussion of compensation paid to railroad employees and the cost which railroads pay for labor material and equipment.

It is stated that compensation paid to railroad employees increased 151 per cent in 1920 over 1916, and to 105 per cent in 1921 over 1916; that the number of employees increased in 1920 over 1916 by 384,830 and that in most cases the hours of work increased in much lower ratio.

# Putting Idle Equipment to Use

## How Some Manufacturers Are Keeping Their Plants Busy—Two or More Separate Outlets Prevent Shutdowns

BY STERLING H. BUNNELL\*

WHEN a manufacturer is forced to admit to himself that business depression is upon him and expenditures must be cut, the step that he most dreads is reducing his working force. It is generally easy enough to put new names on the payroll when business revives; but it is not easy to get back the trained men who have hustled for other jobs and become settled in new surroundings. The idea of having to board up the windows every once in seven or ten years, let dirt and cobwebs accumulate, and then after a while turn to and train another force of workers in the established habits of the concern, has directed the minds of many manufacturers to the desirability of taking on some new line of production, first, to provide work to keep the wheels turning, and second, to open up business in two or more sales fields which will not be subject to exactly the same causes and times of depression.

For causes well known and easily understood, in the metal trades, those shops which make metal-working machinery have been the most severely affected by the general attempt to reduce expenditures in all industries. The demand simply was not there, and most of them, recognizing the fact, cut down their sales efforts and expense until a turn should take place for the better. But with men and equipment available, more than one manufacturer is now refusing to continue his forced vacation until better times, and instead is embarking on a venture in some field where existing facilities can be utilized to produce goods and return a profit.

### Making the Lesser Carry the Greater

The Bilton Machine Co., Bridgeport, Conn., was organized by C. E. Bilton to manufacture milling machines and cutters. Mr. Bilton had been engaged in the production of machinery, tools and fixtures for a large manufacturing plant, and his knowledge rapidly built up the new business and filled the shop with orders. His earlier years, however, had been spent in the manufacture and sale of telephone equipment and electric supplies, giving him a wide acquaintance in the electrical trade. He had kept up his interest in this class of work through a connection with a concern producing electric specialties. This corporation had little of his attention until the demand for machine tools ceased and left the large organization flat.

The slump came just before the successful development of the wireless telephone caused a sudden demand for radio equipment for amateur use. Mr. Bilton immediately reorganized his electrical manufacturing concern as the Elwood Electric Co., and began to produce parts for wireless telephone apparatus. As this business expanded, idle space in the machine shop was put to use, and the necessary tools and fixtures for the work were produced by the Bilton Machine Co. All

equipment for producing the radio devices is now being made as required, including the design and construction of such machines as presses for forming the sheet metal parts. At present, the machine tool organization is largely occupied in fitting up the electrical shop, and the production of electric specialties is being rapidly increased.

The fortunate possession of all the essentials for producing and selling electric specialties has thus made it possible for Mr. Bilton to develop a small business into a large one, at the opportune moment when his previously large business had become small. The machine shop has become the support and feeder of the electrical factory, and will thus be enabled to carry over until the demand for machine tools again becomes active. By shifting workers to the new organization as far as possible the Bilton organization is maintained. The two corporations supplement each other by operation in entirely different sales fields, so that future depression in the one is not likely to be coincident with depression in the other.

### New Uses for an Alloy

The situation has been similarly met by the Baush Machine Tool Co., Springfield, Mass. This corporation, through its metals division, has for some time produced the lightweight alloy duralumin, having the

general properties of mild steel as to strength and ductility. As the machine tool demand fell off, attention was diverted to developing new uses for the alloy, and to producing new shapes and forms for component parts of machines, particularly automobiles. Having a tensile strength of 60,000 to 65,000 lb. per sq. in., duralumin in rods and sheets is a desirable substitute for steel in forming stamped or drawn parts, rolled and forged shapes. The manufacturers have produced disk automobile wheels and detachable rims, hub caps, and other rolled or drawn parts; also worm gears for motor-truck rear axles, which gears are as strong and durable as bronze, and being much lighter in weight, relieve the rear axle frame of a great part of the shock and strain on rough roads.

The Baush Machine Tool Co. is of course in position to produce all necessary machinery for working duralumin into shapes as required. New parts and uses are being developed as rapidly as possible. The increasing demand for such light and strong alloys will undoubtedly enable the organization to devote its principal effort to the production of duralumin parts for distribution to a wide variety of interests, and leave the original business of manufacturing machine tools to take a permanent second place.

### Abrasive Becomes Safety Tread

To enter a new field of use with a new product usually requires the development of a new sales organization and system, even though the manufacturing

*THIS is the second of a series of five articles by Mr. Bunnell; the first appeared May 4. These articles have been prepared from an investigation, at the instance of THE IRON AGE, to learn what the metal-working industries are doing to improve the business position. They show a remarkable, but not unexpected, adaptability to conditions on the part of wide-awake manufacturers.*

*The titles of the remaining three articles are:*

*Progress in Readjusting Manufacturing and Sales Costs.*

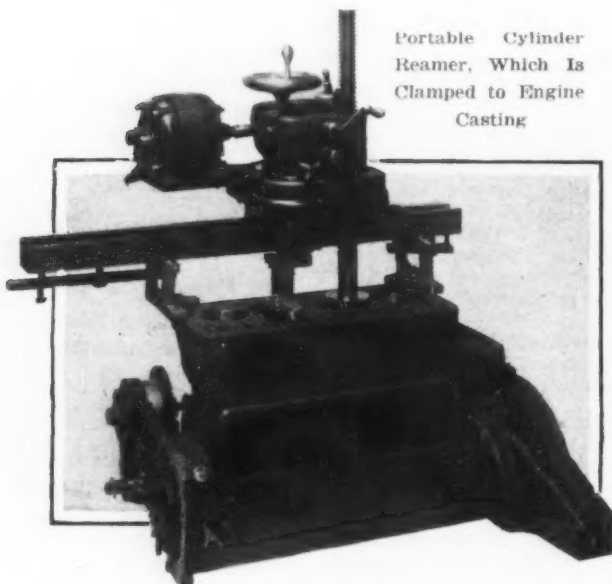
*Progress in Conversion of War Factories.*

*Broadening the Sales Field.*

\*Consulting engineer, New York.

equipment may need little if any change. If there is any one field which at this time must show activity above all others, it is that of the building trades. The orderly increase in houses, apartments and office buildings necessary to take care of the steadily increasing population of the United States suffered a check for two years of war and three more years of excessively high cost of materials and labor, and all of the lost time must shortly be made up. The Norton Co., Worcester, Mass., has taken advantage of this condition to put to work a largely increased productive capacity originally intended for the manufacture of grinding wheels and abrasives generally.

Several years ago the Norton company brought out a nonslipping tile composed of alundum and a ceramic binder, burned in a kiln. The same properties that make the material useful in cutting metals serve to maintain the sharpness of the cutting fragments which hold the shoe-soles of the passers-by from slipping on steps and pavements of alundum tile, and also to maintain the surface of tile itself under the heaviest traffic. Naturally, a pavement virtually composed of grinding wheels would be expected to be costly as well as effective, and so the tiles were at first offered as the last extreme of perfection for subway stairs and railway



Portable Cylinder Reamer, Which Is Clamped to Engine Casting

station ramps and walkways, where high price was a secondary consideration because all other materials were unsatisfactory.

From a condition of being six months behind on delivery of orders for grinding wheels, the Norton Co. was almost instantly left by cancellations with an unsold stock, and at a time when a large increase in kiln capacity had just been completed. The possibility of developing a business in floor tiling, sufficient to employ this surplus capacity, suggested itself. Manifestly there is only a narrow field for a plain unornamental tile at a price considerably higher than other material, even though the latter were less durable and gave a less secure foothold. It was therefore decided to engage men skilled in the use and sale of ornamental tiling, and to develop a material of fine appearance, in varied designs suitable for all conditions, always with the desirable non-slip quality, and at prices which would make it salable in competition. This has been done with great success.

The Norton non-slipping floor tile is now offered in various sizes, and in several colors; also in terrazzo, or in patterns, or with various inserts of black or colored marble or other stone. It is made in shapes suitable for stair-treads, thresholds, steps and ramp pavements. Being largely composed of alundum, its durability is far in excess of any other floor material. It

is priced very little in excess of ordinary tiling and terrazzo. Its durability under the heaviest traffic makes it the cheapest possible pavement.

A very moderate development of the tile business would seem likely to utilize fully an equipment sufficient for making an enormous quantity of abrasives for shop use. Having opened sales offices in several cities in the course of starting a national sales campaign, it seems probable that the Norton Co. will soon be producing a tonnage of alundum tiling far in excess of its former tonnage of grinding wheels.

### Portable Cylinder Reamer

Many new tool-making shops were organized to meet the excessive demand for special cutters and other tools for war production, and later by the activity in automobile manufacture. Most of these concerns have been left with very little work, a condition intensified by the lack of railroad purchasing due to reduced traffic earnings and to the high wages of railroad shop employees. Some of these shops must find new lines of production or give up business. The Bridgeport Cutter Works, Bridgeport, Conn., is saving its own situation by putting on the market a new portable machine for reaming worn automobile engine cylinders, which costs much less than a cylinder grinding machine and does a thoroughly satisfactory job in very quick time.

The machine is adapted to clamp directly on the upper flange of the cylinder block, as illustrated. Adjustments are provided for centering the cutter spindle in each cylinder in succession, dividing the inequalities due to scoring and wear, so as to remove the minimum amount of metal necessary to produce a perfect surface. On all but one or two of the smallest cars there is room to set up the machine on the engine as it stands in place, instead of being obliged to remove it from its position. The machine is provided with reamers for oversize reaming, five, ten and fifteen thousandths larger than the standard bore, so as to suit the oversize pistons regularly supplied on order by the manufacturers. It is driven by a suitable electric motor mounted in place on the cutter-bar mechanism. Besides costing but a fraction of the price of a cylinder grinding machine, it produces a surface better adapted to retain the film of lubricating oil.

This cylinder reaming machine is suitable for use by a large number of owners of repair shops, and by operators of fleets of trucks, taxicabs and buses, and has therefore a wide field of sale. It is of the type of machinery that is in demand for the repair work that must go on alike in good or bad times. It is particularly suitable as a product for the plant of the Bridgeport Cutter Co., because a supply of reamers is needed with each reaming machine, giving use for all the existing cutter-forming and heat-treating equipment.

### Washing Metal Parts

In some cases special machinery built for the service of an industrial plant can be adapted for other plants and made into a regular line of production. The Colt shop in Hartford has developed washing apparatus that is salable in two important fields of use. One is for the removing of oil and chips from machined pieces, as required for screw machine products, hardware and many other articles of bright metal. The desirable outside field of sale is also provided by the suitability of the machine for dish washing in restaurants, hotels and institutions.

The washing machine for use in machine shops, as recently described and illustrated in *THE IRON AGE*,\* has a traveling bed on which the articles to be washed are placed and automatically carried into, through and out of a spray chamber. The spraying system is operated by a motor-driven pump which forms part of the

\*Page 1080, issue of April 20.

machine. The apparatus as offered for washing dishes in large numbers is made also in a round type of somewhat less capacity, easily used by one operator, who puts in the soiled dishes and removes them at the same point, after they have made one or more complete revolutions on the revolving table of the machine.

Every one of the cases cited above is an example of

the advantage of having two strings to the bow, so that one is always ready for an emergency. It is, of course, good economy to standardize on one product and stick to it; but when hard times come all rules have to be set aside, and business must be gone after where it can be obtained, if the wheels are to be kept turning.

## Electric Iron and Steel from the Same Furnace

### Castings from Scrap Only—Melting and Foundry Practice in Intermittent Operations

THE Alaska Treadwell Gold Mining Co. has been manufacturing electric furnace iron castings since October, 1918. The factors that entered into the adoption of the electric furnace were many, and the results such as to warrant the discontinuing of cupola melting.

For a period of about seven months in the year the Treadwell company has a surplus of electric power generated by its hydroelectric plants. During shortage power may be obtained from another local company at a very reasonable rate. Hence the factor of power supply which is most important is very favorably taken care of. We are charged nominally at the rate of 1c. per kw. Connellsville coke costing \$8 per ton on the

trolled by the addition of the ferroalloys to the bath.

For economic melting of cold scrap iron in the electric furnace the nature of the charge is very important. The charge must not be too dense, otherwise the electrodes will not penetrate it, but do most of the melting from the top. This will cause early heating of the upper part of the furnace with subsequent losses by radiation. The melt will be dead, and will require considerable unpleasant manual labor of poking to free the bottom of metal. Sprues and gates make the best charge for the bottom, clean scrap for the top is desirable for electrical conditions, as insulation is very common when melting cast iron.

In starting very low current is used until a good circuit is established. If insulation develops, the best remedy is to shovel crushed electrodes, about walnut size, around the electrode that is giving trouble. This electrode material will afterward unite with the lime to form a carbide slag. As soon as full current is on the lime is shoveled in. The lime requirements are about 2 per cent of the charge, with sufficient fluorspar or silica sand added to make it active; coke is added with the lime. The resultant slag is strongly carbide and will analyze up to nearly 1 per cent sulphur. If the slag is kept right, very little hearth repair is necessary, usually 10 to 20 lb. of magnesite will suffice. The danger of burning the bottom is slight, as cast iron melts at a much lower temperature than steel.

The temperature of the metal is under control of the operator. Electric furnace iron is necessarily poured hotter than cupola iron, due to the absence of fluid forming impurities. By running hot iron it is possible to reduce the size of gates and risers.

Foundry procedure when using an electric furnace is different from the cupola. The time-honored custom of molding until the cupola blast is on is discontinued. The pouring does not interfere with the molding, the pouring being done by a few men. The rush to keep the metal away from the cupola no longer exists. The confusion of dull heats has gone. Iron from the electric furnace may be tapped in any amount from a few pounds to the whole charge and at any interval, the remainder in the furnace being held at the required temperature until called for, raised or lowered if desired. The floor can be cleaned up almost immediately, as low sulphur iron is noticeably not so tender, and may be pulled out while still hot without injury.

The most distinguishing characteristic of electric furnace gray iron is its uniformly fine-grained nature. It is claimed by some to be due to low phosphorus, which prevents grain growth. As the same texture is found when the phosphorus is fairly high, low sulphur must have some influence, but probably the greatest factor is the thoroughly deoxidized condition of the metal and the absence of occluded gases.

#### Power Consumption

Power consumption varies greatly with both iron and steel, depending upon whether or not the charge is melted in a cold furnace or after a previous heat. While the range is not very great, the results are interesting:

	Kwhr. Per Ton	
	Iron,	Steel
Single voltage .....	784	893
Dual voltage .....	709	851

The averages were taken for 25 consecutive heats

Table I—Analyses of Electric Cast Iron from All-Scrap Cupola-Melted Charges

Heat	Silicon, Per Cent	Manganese, Per Cent	Sulphur, Per Cent	Phosphorus, Per Cent	Carbon, Per Cent	Graphitic Carbon, Per Cent
14A	2.15	0.44	0.030	0.334	2.96	...
149	2.02	0.47	0.056	0.49	2.90	...
131B	1.83	0.57	0.020	0.41	2.95	...
70	2.19	0.64	0.048	0.44	2.96	...
121	1.93	1.28	0.054	0.50	3.01 <sup>1</sup>	...
144	1.88	0.61	0.064	0.37	3.17	...
151	2.19	0.67	0.044	0.45	3.23	...
154	1.64	0.63	0.031	0.40	3.23	...
163	0.69	0.54	0.071	0.23	2.50 <sup>2</sup>	...
166A	0.69	0.49	0.086	0.190	2.43 <sup>2</sup>	...
166B	1.78	0.55	0.032	0.195	2.42 <sup>3</sup>	...
172	0.65	0.62	0.049	0.29	2.50 <sup>4</sup>	...
178	2.18	0.58	0.031	0.36	2.55	2.54
181	2.00	0.54	0.027	0.38	2.80	2.81
184	1.56	0.58	0.023	0.195	3.27	...
10C	1.79	0.56	0.049	0.52	2.81	2.62
48	1.56	0.47	0.069	0.33	2.72	2.71
61	1.77	0.55	0.054	0.40	2.77	2.50
77	1.73	0.57	0.063	0.53	2.58	2.57
92	1.74	0.45	0.055	0.53	3.16	2.78

<sup>1</sup> After first tap 160 lb. manganese steel was added.

<sup>2</sup> Hard iron.

<sup>3</sup> Before last tap of 166-A 12 lb. ferrosilicon was added to pour a rush order of castings. These castings machined nicely.

<sup>4</sup> Add to analysis—Cr 0.61. Chrome ore was used in charge with gray iron to make hard iron.

Atlantic Coast costs \$48 per ton delivered to the foundry. Foundry pig iron costs from \$45 to \$50 delivered. The conditions above mentioned make it possible to produce electric furnace iron castings cheaper than can be done with the cupola, not to mention the great difference in quality.

#### Duplexing With the Cupola

It was soon found that pig iron was unnecessary. An all-scrap charge of machinery scrap melted and refined on a basic hearth resulted in a superior quality of metal. The melting is done in an 800-kw., 3-phase, 2-ton Heroult furnace in a neutral or reducing atmosphere under a reducing slag.

For medium weight castings no additions are made; for small castings and thin sections the silicon can be increased as desired by addition of the ferroalloy. The analyses in Table I are mostly from all-scrap cupola-melted iron that has been through the electric furnace. The high percentage of sulphur in commercial scrap can be easily eliminated through the medium of the electric furnace. Phosphorus can be controlled by the use of steel scrap; silicon and manganese can be con-

\*From a paper "Electric Furnace Iron and Steel; Intermittent and Alternating Operations," presented at the spring meeting of the American Electrochemical Society at Baltimore, Md., April 27 to 29. The author, W. E. Cahill, is metallurgist and foundry superintendent Alaska Treadwell Gold Mining Co., Treadwell, Alaska.

each of iron and steel after new lining. With steel the higher voltage is used for melting and the lower for refining; with iron the change is made to lower voltage when the scrap is nearly all in. If the higher voltage is left on after the scrap is all in the furnace heats up too much. The above figures are for intermittent operation and may seem high, but melting cold scrap in a cold furnace is necessarily high, as considerable energy is absorbed in heating the furnace.

Intermittent operation of the electric furnace shows its most severe effect on electrodes and roof. Alter-

Table II—Analyses of Steel Made in a Furnace Following Iron Heats

First heat of steel after iron				
Silicon, per cent.....	0.15	0.34	0.39	0.24
Manganese, per cent...	0.68	0.87	0.57	0.58
Sulphur, per cent.....	0.052	0.048	0.049	0.068
Phosphorus, per cent...	0.065	0.040	0.048	0.047
Carbon, per cent.....	0.41	0.50	0.31	0.37
Second heat of steel after iron				
Silicon, per cent.....	0.27	0.32	0.34	0.31
Manganese, per cent...	0.73	0.68	0.78	0.79
Phosphorus, per cent...	0.038	0.041	0.041	0.018
Sulphur, per cent.....	0.021	0.026	0.030	0.040
Carbon, per cent.....	0.40	0.47	0.34	0.42

nating heating and cooling of the roof, with its corresponding expansion and contraction, causes spalling of the silica brick. Sheet asbestos seems to be the best expansion medium. We have been able to get over 200 heats to a roof.

#### Alternating Iron and Steel Heats

When alternating heats of iron and steel great care must be taken in furnace operation. Of prime importance is a good spout so that the furnace will completely drain. The effect of residual iron is very noticeable on steel. The slag must be fluid enough to run out with the iron, otherwise it will mean additional sulphur to be removed from the next heat of steel. If a heat of steel is desired after iron, the furnace should be charged with low carbon steel scrap so the melt will be fairly low. The carbon may be lowered by adding iron ore, but there is a limit to this reaction. If carried too far it will begin to show its effect on the furnace. The removal of sulphur is not dependent upon carbon in the steel, but upon the length of time the steel is held under a carbide slag. If the sulphur is high the heat will necessarily be prolonged, which is objectionable for furnace reasons.

The analyses for steel directly after iron are shown in Table II. After the first heat of steel there is no noticeable effect of iron, and the procedure may continue as in ordinary practice.

#### Pittsburgh Steel Co. Acquires Ore

The Pittsburgh Steel Co., Pittsburgh, has acquired an interest in the Plymouth Mining Co., controlled by Pickands, Mather & Co., Cleveland, operating an ore property located in the Menominee range, Gogebic County, Mich., section 18, township 47, range 45. This mine, which is an open pit operation, was first opened in 1916. It yields soft red non-Bessemer hematite ore and is capable of 750,000 gross tons annually. This acquisition gives the Pittsburgh Steel Co. a new supply of ore to take the place of the Rowe mine, operation of which was discontinued at the close of the 1920 mining season because of the marked decrease in the available reserves of merchantable ore, and because of the high cost of extracting the low grade ore which remained.

The American Industrial Engineering Co., Chicago, has recently taken an order from the Tennessee Coal, Iron & Railroad Co. for the installation of complete low pressure pulverized coal burning plant for utilizing pulverized coal as fuel under one of the boilers in that company's new power plant at Ensley, Ala. The boiler under which this installation is to be placed is a Sterling 834-hp., designed to operate at 200 per cent of rating. A particularly interesting feature of this installation is in the system of control whereby the operation with this fuel will be practically automatic. The pulverized coal burning equipment is designed with sufficient capacity to run the boiler on this fuel alone, but it will be operated in conjunction with blast furnace gas, and either fuel used independently.

#### Lake Iron Ore Shipments in April

Shipments of iron ore from Lake Superior ports in April, this year, as compared with April, 1921, were as follows in gross tons:

	April, 1921	April, 1922
Escanaba .....	.....	40,219
Marquette .....	.....	.....
Ashland .....	9,149	24,555
Superior .....	111,848	52,387
Duluth .....	27,431	19,000
Two Harbors .....	27,783	.....
Total .....	176,211	136,161
Decrease .....	.....	40,050

The Great Northern ore dock is credited with 17.64 per cent of the total this year as compared with 45.35 per cent last year. The Duluth proportion this year was 13.95 per cent against 15.57 per cent last year.

#### Large Automobile Production

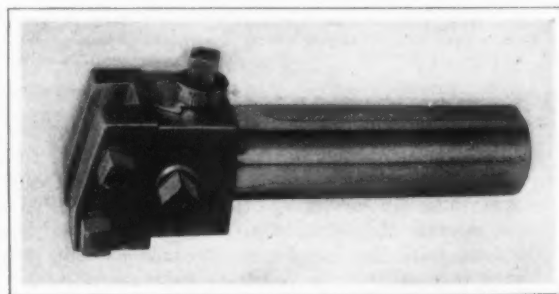
According to *Automotive Industries*, the production of passenger cars and trucks in April, by all manufacturers in the United States, is estimated at 213,000. This is very near the record production for any one month, and it is thought that when final figures are available a new record may have been made. In any case the production for May will, it is anticipated, be a new record.

It has been estimated that the probable 1922 production of automobiles in the United States will amount to 1,800,000 cars. This compares with an estimate of 1,680,000 in 1921, with 2,200,000 produced in 1920, 1,875,000 in 1919, 1,150,000 in 1918, 1,870,000 in 1917, and 1,583,000 in 1916. No year previous to 1916 reached 900,000 cars.

#### New Cutter Holder for Turret Lathes

An adjustable angle cutter holder for turret lathes, intended to eliminate guess work when adjusting the cutter to close limits, has been placed on the market by the Warner & Swasey Co., Cleveland.

In turning to accurate size with a cutter head at least two cuts must be taken over the surface of the work. The roughing cut can be held to a limit of 0.004 with the usual holder by tapping the cutter lightly with a hammer. When using the common holder for



The Screw Adjusts the Cutter Accurately. A limit of less than 0.001 can be held

the finishing cut, however, considerable skill is required to prevent moving the cutter too far. The adjustable angle holder illustrated was designed to eliminate guesswork in the matter.

A graduated adjusting screw operates a small but rigid cutter slide. The screw adjusts the cutter so that a limit of less than 0.001 can be held. The head is of hardened steel throughout and a series of severe tests proved it to be rigid.

When in use the lock screw is drawn up tightly and kept in that position so that adjustment can be made without changing the tension of the screw. An adjustment as small as 0.0005 in. is said to be possible.

In addition to obtaining the original setting easily and quickly, the exact size as the cutting edge wears can be maintained.

The Yorkville, Ohio, works, Wheeling Steel Corporation, now has 12 of the 24 hot mills in operation.

# Design of Open-Hearth Furnaces

## Loss of Heat Through Leaking Brickwork and Convection Currents—Waste-Heat Boilers— Fuels Available

BY A. D. WILLIAMS\*

**W**IND exposure has a certain effect upon furnace operation, for it affects the chimney draft appreciably. At the same time, it will have an effect upon the velocity with which the air enters the reversing valve, according to its exposure. Mr. Allyn-Reynolds stated, at the 1913 meeting of the British Iron and Steel Institute, that a wind blowing at the rate of 20 miles per hour caused a variation in the rate of flow of air into the reversing valve of from 70 to 350 ft. per second, the entry rate desired being 180 ft. per minute. As variations of this kind are sudden and extremely irregular, it is difficult to compensate for them.

The use of a fan for introducing the air will not entirely eliminate such variations. The fan merely transfers the air through itself, taking the air from the low-pressure side and delivering it to the high-pressure side. Any increase in the suction pressure will increase the delivery rate of the fan. A great advantage of a fan, in delivering the air, lies in the fact that it renders the furnace independent of the stack effect of the regenerators and uptakes for impressing the air velocity at the port, bringing this variable under definite control. If stove type regenerators, extending above the platform, are used, a fan will be necessary to force the air through them.

A considerable amount of heat is dissipated from the wall and roof surfaces of the regenerator chambers, depending upon the extent of exposure of these surfaces, and the air or wind currents to which they are exposed. The proposal to insulate these surfaces has been actively considered. The problem is in the same line as the insulation of the hot blast stove, except for the fact that the regenerator works, usually, at much higher temperatures than the hot blast stove. The heat loss takes place continually, during both the heating and cooling cycles. This has suggested the possibility of recovering a portion of this heat by inclosing the chambers, with an air space all around them, in a sheet iron housing arranged so that the air supply for the furnace is drawn from the highest and hottest portion of the inclosure. This housing should provide sufficient room to permit inspection of the chamber walls.

All regenerative furnaces are more or less subject to explosions at reversal. These explosions crack and otherwise damage the brickwork, producing air leakage, which reduces the temperature of the waste gases and increases their volume. The effect of this leakage is intensified when a strong draft must be used to pull the waste gases out of the furnace. The intensity of the draft depression increases progressively from the port to the base of the stack, and necessarily the seriousness of the air infiltration increases as the draft depression increases, the greatest amount of air entering the system through the walls of the flues leading to the chimney. Leakage outward undoubtedly occurs with both the air and the gas, but as the pressure within the flues is extremely low, the volume lost is much less than the infiltration through the same wall.

The only way to prevent air from leaking into the flues is to provide them with a covering of sheet steel, of suitable thickness. This will, at the same time, necessitate consideration of the fact that an explosion within a tight casing may be much more violent than that occurring in a brick flue. Such a casing, and the

heat insulation of these flues, will increase considerably the amount of heat available for the generation of steam.

One factor brought out in the preceding computation was the draft depression necessary to pull a proportionate amount of the waste gases through the gas port of the furnace. This indicates that a better working furnace would result from having large uptakes, through which the waste gases would pass with a low velocity down to the cinder pockets. A further advantage resulting from this increase in uptake area on the outgoing end will be a greatly increased efficiency of the cinder pocket in catching cinder, etc., carried out of the furnace, and thus increase the life of the regenerators. When the waste gases pass down the uptakes with a high velocity, they will not make a sharp turn at the cinder pocket, but will impinge upon its bottom, unless a considerable depth is provided. The formula of Yesmann, giving the trajectory of the jet of flame in the furnace, may be modified to give the

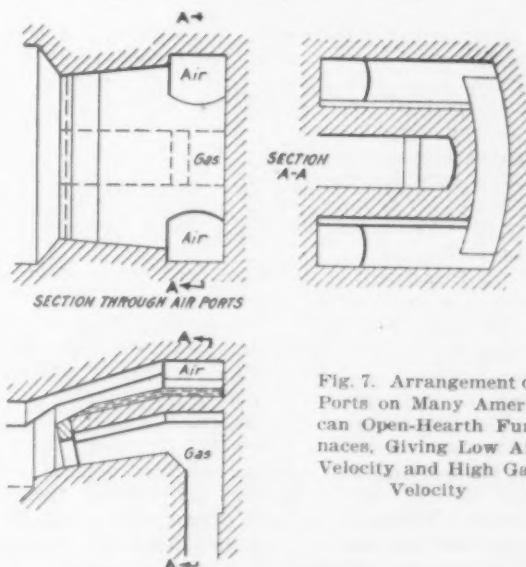


Fig. 7. Arrangement of Ports on Many American Open-Hearth Furnaces, Giving Low Air Velocity and High Gas Velocity

distance vertically downward which a flowing jet of gas will penetrate into a cooler medium, as follows:

$$H = \frac{U^2}{2g} \times \frac{460 + t_i}{t_m - t_i}$$

The temperature of the gases leaving the heating chamber,  $t_m$ , is 2910 deg. (1600 deg. Cent.), and we may assume  $t_i$ , the temperature of the gases in the cinder pocket, as 2550 deg. (1400 deg. Cent.). The velocity of the waste gases in the gas and air uptakes has already been determined as 58.5 ft. (17 m. 83), and 37.14 ft. (11 m. 32) per second, respectively. When these values are substituted in the above formula, the following values of  $H$  will be found:

In gas cinder pocket  $H = 55.58$  ft. (16 m. 94)  
In air cinder pocket  $H = 22.41$  ft. (6 m. 83)

Naturally, if the temperature of the immobile gases in the cinder pocket is cooler than assumed, the penetration of the jet will be less as the difference in temperature increases. But reducing the velocity of the waste gases will decrease the value of  $H$ , according to the ratio of the squares of the velocity.

McKune and Egler, both of whom have attacked

\*Box 92, Newark, N. J. This is the last of five articles on this subject. The first appeared March 2, page 577; the second, March 16, page 717; the third, March 30, page 853; the fourth, April 20, page 1075.

this problem, have produced head constructions which bring the air and the gas together in a rational manner at the incoming end, and provide for an increased area of uptake at the outgoing end. Both of these methods are radical departures from previous head construction. The writer has devised a method of obtaining a similar result, and at the same time presenting the possibility of adjusting the angle of the flame.

Fig. 7 shows a port construction much favored in many American furnaces—a large segmental air port over a smaller gas port. The high gas velocity and the low air velocity result in a long flame. It was also considered that this form of port produced a blanket of cooler air on top of the jet of flame, and in this manner protected the roof. As the coldest gases tend to seek the lowest portion of the chamber, it is somewhat difficult to see just where this argument is tenable. At the same time, the waste gases reaching this large port should be slightly hotter than those reaching the smaller gas port at a lower level. This difference in temperature might not be very large, as the vertical distance between the ports is not great.

However, a much larger proportion of the waste gases would be drawn off through this port, and as a result, the air would be preheated to a higher temperature than the gas. With this construction the gas regenerator is strangled, that is, it cannot obtain the proportion of the waste gases necessary to preheat the incoming gas to the same temperature as the air supply, unless a considerable draft differential is available to force a correct division of the waste gases. A further disadvantage of this type of head is the tendency of the bath to chill at the incoming end, with irregular reversals.

Port erosion, increasing the area of the gas port and reducing the jet velocity, has been very troublesome, as a point is speedily reached at which the proper sintering of the bottom becomes impossible. This entails shutting down the furnace for repairs, with consequent loss of production. Water-cooled ports are a partial cure for the trouble. They increase the time between port repairs, but they do not contribute to the correct division of the waste gases between the regenerators.

Another result of this improper division of the waste gases is a tendency for the furnace to work cold. That is, the time per melt is increased, owing to the improper combustion conditions produced. At the same time, the wear upon the furnace is greater, particularly upon the roof, gas ports, cinder line, etc.

The durability of any material exposed to heat depends upon its ability to conduct this heat away from the heated end, and emit a sufficient amount of heat from its cool end, to prevent the hot end from overheating. When the hot end commences to absorb heat faster than the cool end can emit heat, the temperature of the hot end will begin to rise until it fails.

Water cooling supplies a more rapid method of removing heat than air currents. It is particularly valuable in those cases where the refractory is subject to erosion or chemical action at high temperature, as both these forms of attack are more rapid at high temperatures. Another function of water cooling is in reinforcing the rigidity of the binding of the furnace. Metal work exposed to heat will warp. Cooling it prevents warping and holds the furnace to line; but, like everything else, it is possible to overdo the cooling. Cooling apparatus requires careful consideration, and must be designed in such a manner that all steam pockets are avoided. With an open-hearth furnace, as with a blast furnace, cooling should be used only to hold vital points which cannot be held in any other way.

Thermal insulation for the conservation of heat will be successful only where the maximum temperature to which the refractories are exposed is less than their yielding temperature, and where a sufficient thickness of the refractory is interposed to protect the insulation from temperatures above its yield point. In some cases the insulation will replace a certain amount of refractory brick, which serves to reduce the cost of the insulation. In other cases the insulation will be an addition to the cost of the refractories. The whole question must be settled on the basis of "will it pay?" The balance between the cost of the thermal insulation and

the value of the heat which it makes available for other purposes must not only pay the interest upon the investment, but must supply funds for maintenance, etc., and eventually replace the capital invested. It is needless to say that the output of the waste-heat boiler will be increased by the delivery of high temperature gases.

Waste-heat boilers are an indirect method of heat recovery. The main purpose of the furnace is the production of steel, and auxiliary apparatus cannot be permitted to interfere with this. Considerable diversity of opinion exists in regard to waste-heat boiler design and installation, the type of boiler and the method of baffling.

High gas velocities have been considered necessary for rapid heat-transfer from gas to water. Such velocities, which mean a considerable draft differential through the boiler, are based upon the idea that at high velocities stream line flow of the gases is replaced by confused eddies. Stream line flow cannot occur with gases which are in contact with surfaces hotter or cooler than themselves. The difference in density created by temperature changes impresses local recirculating loops, which eliminate stream line flow.

A good idea may be gained of these confused currents by observing any current of hot air rising alongside a hot furnace. These currents may be rendered visible by using a bright light, which will be partially polarized by the eddies created, causing them to throw a shadow. A light which contains an appreciable proportion of the blue end of the spectrum will render visible the heat waves beyond the visible end of the spectrum.

There are two important factors in a gas-to-fluid heat transfer through a metal partition, either one of

Table II.—Temperature and Heat Available for Steam Boiler

Temperature, Deg. Fahr.			Volume of Waste Gas, Cubic Feet			B.t.u. Available per Second		
Initial	Final	Drop	Initial	Final	Change	Initial	Final	In Boiler
1,652	752	900	1,939	1,114	825	17,206	7,326	9,880
	662	990		1,028	911		6,337	10,869
	572	1,080		947	992		5,488	11,718
	482	1,170		866	1,073		4,540	12,666
1,472	752	720	1,777	1,114	663	15,134	7,326	7,808
	662	810		1,028	749		6,337	8,797
	572	900		947	830		5,488	9,646
	482	990		866	911		4,540	10,594
1,292	752	540	1,610	1,114	496	13,492	7,326	6,166
	662	630		1,028	582		6,337	7,155
	572	720		947	663		5,488	8,004
	482	810		866	744		4,540	8,952
1,112	752	360	1,443	1,114	329	11,168	7,326	3,842
	662	450		1,028	415		6,337	4,831
	572	540		947	496		5,488	5,880
	482	630		866	577		4,540	6,628

Base Data:						
Temperatures, initial,						
	Deg. Cent.	500	600	700	800	900
	Deg. Fahr.	932	1,112	1,292	1,472	1,652
1 + at		2.84	3.20	3.57	3.94	4.30
Temperatures, final,						
	Deg. Cent.	250	300	350	400	
	Deg. Fahr.	482	572	662	752	
1 + at		1.92	2.10	2.28	2.47	
Q <sub>g</sub>	Volume of gas burned per second	= 188 cu. ft. =				
	5 m <sup>3</sup> 32.					
Q <sub>pg</sub>	Volume of products of combustion	= 451 cu. ft. =				
	12 m <sup>3</sup> 77.					
Heat capacity of products of combustion. From curve, Fig. 1 (THE IRON AGE, March 2, 1922, page 577).						
Initial calories		2,814	3,400	3,814	4,336	
B.t.u.		11,168	13,492	15,134	17,206	
Final calories		1,144	1,383	1,622	1,846	
B.t.u.		4,540	5,488	6,337	7,326	
Volumes initial cu. ft.		1,443	1,610	1,777	1,939	
m <sup>3</sup>		40.87	45.59	50.31	54.91	
Final cu. ft.		866	947	1,028	1,114	
m <sup>3</sup>		24.52	26.82	29.11	31.54	

which will limit the value of the test. The heat transmission of the metal will be limited by the manner in which the fluid circulates past the wet surface, to a much greater degree than by the manner in which the hot gases circulate past the dry surface. Practically all recent experiments regarding gas-to-fluid heat transfer through metal have entirely neglected the part played by the fluid in carrying off the heat. Until the fact is recognized that the gases cannot transfer heat to the metal any faster than the water, in turning to steam, is able to carry it away from the metal, very little progress will be made in boiler design.

In metallurgical furnace work it has long been

recognized that there were limitations upon the rate of temperature drop. In this work there is frequently only a small temperature differential between the gas giving up heat and the material to which heat is imparted. In the steam boiler the temperature differential between the hot gases and the water turning into steam is very large, and the main obstacle to a high rate of heat transfer is the poor arrangement of the water circulation.

Table II gives the quantity of heat available for a waste-heat boiler at various initial and final temperatures, together with drop in temperature, initial and final gas volumes and the change in the gas volume due to the drop in temperature. These values illustrate clearly the large amount of heat lost by the drop in temperature between the regenerator and the boiler, and carried away from the boiler by high waste-gas temperatures. With leaky flues there is not only the drop in gas temperature, but the added volume of air, which may increase the volumes to be dealt with by 30 to 40 per cent or more.

The question of waste-heat utilization must be considered upon the basis of whether it will pay. A further factor to be taken into account is the question of dividing the heat, leaving the laboratory of the furnace, between the regenerators and the waste-heat steam generator. The higher the temperature at which the gases are passed to the boiler, the greater its steam generating capacity, and there is the possibility of reducing the cost of the regenerator. The whole ques-

tion of the design of the open-hearth shop and its equipment is a matter of compromise, and balancing one thing with another, in order to secure a desired result—ingot tonnage of the desired quality at a profit.

#### Fuels Which May Be Used

In the course of the foregoing, producer gas has been the only fuel considered. The fuel question depends largely upon local conditions for the particular plant. Natural gas and coke oven gas eliminate the producer plant. Natural gas is becoming scarce and coke oven gas in many localities is not available at a price and in a quantity which will permit its use. Tar is used in a few plants, in order to get rid of the enormous quantities produced by the by-product coking plants. Water gas has been used and blast furnace gas mixed with producer or some other gas—these last were more or less forced by war conditions. Oil and pulverized coals are used. Oil may be atomized by steam or compressed air or mechanically. Pulverized coal adds a certain proportion of its ash to the normal cinder, while finer portions are carried further, and about 25 per cent of the ash passes out of the stack suspended in the gases. With most of these fuels the air only is preheated.

One of the most important elements in the fuel for an open-hearth furnace is sulphur—the less of it the better. It has a tendency to pass into the cinder and metal, under certain conditions, adding to the expense and time of the melt.

### Decrease in Unemployment

HARRISBURG, Pa., May 8.—Eighteen per cent fewer iron and steel workers were out of employment in Pennsylvania on May 1 than on April 15, according to the semi-monthly report of Clifford B. Connelley, commissioner of the Pennsylvania State Department of Labor and Industry. A total of 56,575 were unemployed on May 1 as compared to 68,800 on April 15, the report shows.

Eight of the ten employment districts of the State reported fewer unemployed, while two, Scranton and Altoona, reported an increase in the number of those out of work. The biggest reduction was reported by Philadelphia where 35,000 were unemployed on May 1 and 45,000 on April 15.

The unemployed in the metal and machinery trades, by districts, on April 1 and May 1, follow:

	April 15	May 1
Altoona .....	600	875
Erie .....	5,000	4,500
Johnstown .....	3,500	3,000
McKeesport .....	1,400	1,200
New Kensington .....	900	700
Philadelphia .....	45,000	35,000
Harrisburg .....	2,500	2,000
Pittsburgh .....	6,000	5,000
Scranton .....	3,500	4,000
Williamsport .....	400	300
Totals .....	68,800	56,575

Philadelphia, where the biggest decrease was noted, reports that "better conditions seem to prevail in the iron and steel trade." The Alan Wood Iron & Steel Co., Conshohocken, is now reported to be operating six of 12 open-hearth furnaces, of which only two were working a month ago. Operation as a whole is at 50 per cent capacity. Midvale Steel at Nicetown is reported to have called for open-hearth labor, while Baldwin Locomotive Co. has been operating its two plants two days a week. An early improvement is expected. The company, according to the report, is understood to have a great many orders, but work on them is being pushed slowly because of the delayed deliveries specified.

Harrisburg reports very good conditions. Mills employing from 5,000 to 6,000 men are now producing on an eighty per cent basis, as compared to 40 and 50 per cent during the first quarter of 1921. Small mills are understood to be operating close to 100 per cent basis. No interruption is expected as the result of the coal strike.

Altoona reports there has been a slackening during the last two weeks, and conditions are unpromis-

ing. Erie reports continued improvement, with many skilled mechanics recalled recently. Johnstown is optimistic, for steel mills are reported to be running approximately 60 to 70 per cent of normal capacity. McKeesport reports considerable activity in all steel and iron plants in the district. New Kensington reports that all mills are operating very well, with strong hopes for this operation to continue. Pittsburgh says that conditions in this industry are much better; that there has been a slow but gradual increase in the demand for workmen. Scranton is pessimistic, for the coal strike has affected its mills. Those working at all are using reduced forces. Williamsport reports that improvement has continued.

The total number of unemployed persons in the state, exclusive of striking coal miners, is reported to be 215,410, a decided reduction over the report of April 15.

### Plans of Dominion Alloy Steel Corporation

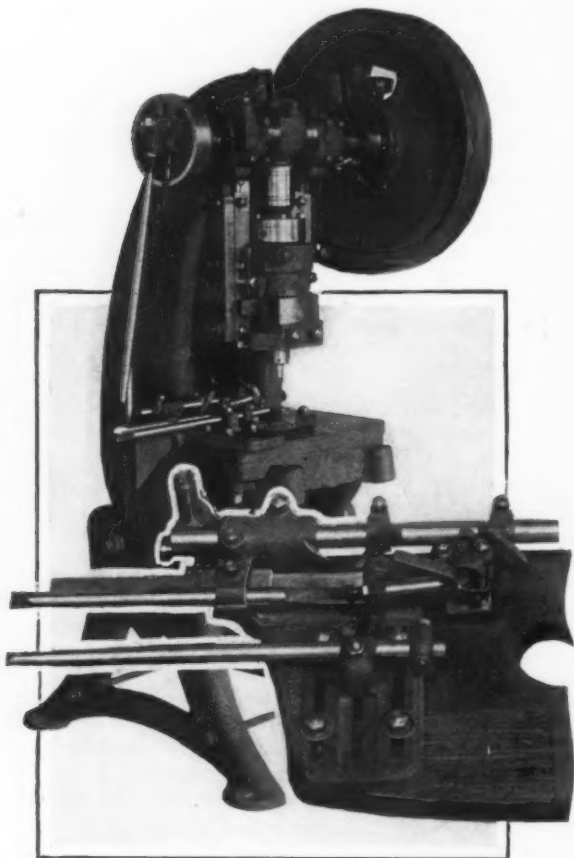
TORONTO, May 8.—An issue of \$5,000,000 8 per cent preferred stock of the Dominion Alloy Steel Corporation, Sarnia, Ont., is being offered in the United States and Canada by a syndicate of Detroit, Toronto and Montreal brokers. The issue will carry with it a 40 per cent bonus of common stock, and of the total of \$5,000,000, \$3,500,000 has been underwritten in Michigan, Illinois and Ohio by a syndicate headed by William A. Near, president of the Detroit Stock Exchange. The Dominion Alloy Steel Corporation has been formed to manufacture in Canada alloy steel by the electric process and will erect a modern plant at Sarnia, Ont., at a cost of \$5,000,000 to take care of present Canadian requirements. The company has associated with it men who have been connected with the alloy steel industry of the United States. Harry Ross Jones, Canton, Ohio, chairman of the board, joined the United Alloy Steel Corporation, Canton, in 1904, and under his management and presidency it has grown rapidly. The Sarnia plant will manufacture for the automobile and alloy industries high grade steels, which are now imported from the United States.

Eight hundred laborers of the H. B. Smith Co., Westfield, Mass., heating appliances, have refused to accept a reduction in wages of from 16 to 20 per cent, and went on strike May 1, thereby throwing 1200 union molders employed by the concern out of work.

### Automatic Push or Pull Press Feed

The Walsh Press & Die Co., 4709 West Kinzie Street, Chicago, has put on the market an automatic push or pull feed for feeding roll or strip stock in power presses. A feature of the feed is that it is actuated entirely without the use of brakes.

The device is shown in the illustration and is fastened to a standard bolster which is easily attached to all patterns of power presses. A gripper adjustable to the thickness of the stock is located at the end of a horizontal rack which is given a reciprocating stroke by a pinion meshing with a vertical rack actuated by a connecting rod from a crank disk on the driving shaft of the machine. The gripper is automatically opened



The Feed Fastens to Standard Bolster as Shown

and closed by tee-head dogs on an adjacent trip bar. At the end of the forward stroke (assuming that push rather than pull feed is used) a dog opens the gripper, while at the end of the return stroke a dog closes on the stock again preparatory to pushing it forward. A V-point is usually employed in the gripper, but a floating flat-end contact may be substituted if a secure grip is desired which will not mar the stock.

The stroke may be lengthened or shortened by changing the position of the crank pin on the crank disk and adjusting the position of the dogs proportionately. The stock is guided in two parallel grooved gages, the edges of the stock passing through the grooves. To overcome any tendency of the stock to be thrown back on the return stroke of the gripper, an adjustable pawl has been provided on one of the gages. The stroke of the feed is adjustable from 0 to 6 in., while the gages can be adjusted to handle stock from  $\frac{3}{4}$  in. to 6 in. wide.

The stock may be pushed to the die or pulled to it to suit the practice of the user. The change is easily made by transposing the tee-head dogs on the trip bar and turning the crank disk on the end of the shaft 180 deg. The feed can be easily placed close to the die or a distance away from it by extending or withdrawing the gage bars, the automatic gripper and the tripper bar to the operating position desired. The adjustment of the feed for the width of the stock is accomplished both by altering the position of one gage

on the casting on which the feed is mounted, and by changing the position of the casting itself on the bolster plate. It is necessary to alter the position of the casting on the bolster to bring the center of the stock in line with the center of the die.

A principal motive in the design of the feed was to obtain accuracy in operation, and to this end positive gripping of the stock, regulation of the length of each stroke of the gripper and safeguards against the throwing back of the stock on the return stroke have been provided.

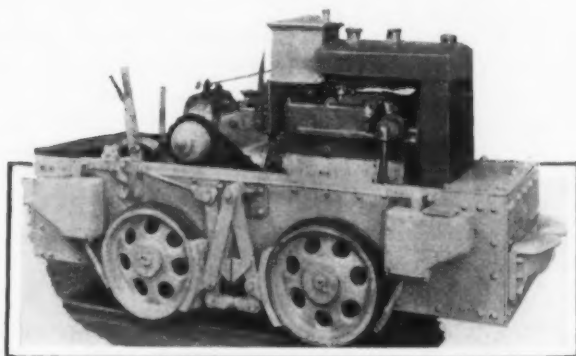
### Gasoline Locomotive for Light Haulage

The Atlas Car & Mfg. Co., Cleveland, has placed on the market the new gasoline and kerosene locomotive shown in the illustration, designed for light haulage and built for severe service. The motor is of the rugged tractor type with all parts inclosed but accessible. The intake air is washed by passing through a water clarifier which removes the dust. Splash system of lubrication is provided.

The clutch is in the usual location just behind the flywheel, and at the end of the propeller shaft is a bevel pinion which is in constant mesh with two bevel gears, causing the latter to rotate in opposite directions. Forward or reverse motion is obtained by engaging either one of these gears through a sliding gear clutch. The drive from the bevel gear shaft is by a spur gear reduction to the jack shaft on the ends of which are mounted sprockets which drives the axles through roller chains. Speed changes are obtained by throttle control similar in operation to the steam locomotive. All control levers are conveniently grouped in the operator's compartment.

The power plant is mounted in a structural steel frame similar in design to that used in the company's line of electric locomotives. The equipment includes hand operated brakes with renewable brake shoes, hand operated sanders and bumpers. Cast iron wheels are standard equipment, but steel wheels or steel tired wheels can be supplied, as well as a cab for inclosing the operator and mechanism.

The locomotive has a drawbar pull of 800 lb. at 4.8 mi. per hr. and a maximum speed of 8 mi. per hr. It is built for a track gage of 24 in. or wider and will operate



The Capacity on Level Track Is 25 Tons. An 18-hp. four-cylinder motor is used

on a curve with a 13 ft. radius. Without the cab it is 54 in. high, and without the bumper, 94 in. long. The wheelbase is 34 in. It is driven by an 18-hp. four-cylinder motor and has a capacity on a level track of 25 tons. Its weight is about 4000 lb.

Specifications for petroleum products adopted by the interdepartmental Petroleum Specifications Committee are available in pamphlet form as a Government document, issued by the Department of the Interior and known as technical paper 305. Copies may be obtained at five cents a copy by applying to the Superintendent of Documents, Government Printing Office, Washington. The information is naturally of importance to the purchasing agent, and covers such products as gasoline, fuel oils and lubricants. The pamphlet has a total of 40 pages.

# Handling Materials in the Shop

Methods Brought Out by Engineers Differ According  
to Nature of Product—Numerous Repetitive  
Processes vs. Custom Work

**T**HAT progress has been made in various Worcester, Mass., industrial plants in methods of handling material around the shop is evident from discussions on that subject at a meeting of the Worcester chapter, American Society of Mechanical Engineers, held April 27, in the recreation room, Morgan Construction Co. Among those who discussed methods of handling material were C. J. Simeon, production manager Morgan Construction Co.; E. C. Evans, engineer, Wyman-Gordon Co.; H. P. Blumenauer, general manager, Arcade Malleable Iron Co.; A. W. Darling, assistant superintendent, Royal Worcester Corset Co.; B. A. Hildebrant, wheel methods department, Norton Co.; and John P. Sloan, traffic manager, Crompton & Knowles Loom Works.

Mr. Evans said in substance that up to 1915 no serious thought was given to the correct way of handling materials at the Wyman-Gordon Co., drop forgings plant. The company had no separate heat treating department. The furnaces were set up wherever there might be an available space, and the runways, such as they were, were of dirt, which at places was 3 to 4 in. thick.

Prior to that year the routing was as follows: After the bars of steel were cut to length at the bar shear, they were placed on steel trucks and pulled by four or five men through the dirt of the forge shop to the heat furnaces. The trucks were then unloaded, one bar at a time, and the material placed on the charging table. The bars varied in weight from 30 to 90 lb. each. After a truck was unloaded it was pulled back to the shear and reloaded. The labor turnover on this class of work was great, for two or three days was about as long as a new man would stay on the job.

After the steel was forged, the forgings were thrown on the ground, which required their being picked up again and placed on trucks to be moved to the next department. As no one man was in charge of the routing of material, there resulted a piling up of work around some machines, which greatly hampered efficient operation and reduced production in some departments, caused by waiting for material in process.

## Growing Congestion Forces Reforms

In the summer of 1915, with orders piling up on the books, it became apparent that a radical step must be taken to relieve congestion and to route material properly in the various stages of process. After investigation it was apparent the problem did not involve traffic alone; with the old arrangement of departments, progressive routing of material was impossible. A new building resulted. All heat treating furnaces were placed in this building, independent of the forge shop. It was then possible to route material in orderly sequence, as follows:

Bar steel is cut to length at the stock yard shear and placed on steel racks. Storage battery trucks move the loaded racks to the forging furnaces, where they are used as charging tables.

From the hammers, all forgings are placed directly on a steel rack, which is carried by an electric truck to the heat treating department. Here all forgings are taken from the racks, when charging the furnaces, and again placed on the racks after they have been heat treated. From the heat treating department, the forgings are taken to the balancing and centering department, then through the pickling room into the inspection and shipping departments.

In the cycle of process, nowhere are the forgings allowed to be thrown on the ground. The principal features of our system for progressive and economical handling of material are nine elevating platform

trucks, two charging panels, and 400 specially designed steel racks. No material is allowed to be piled anywhere other than on these racks. One man, in charge of the trucks and operators, is held responsible both for the truck activities and for the maintenance of the equipment. It is a very poor investment to use cheap labor for operators.

Aisleways, of concrete, are kept clear at all times. In the different departments spaces are provided where rack loads of material can be stored ahead of operations. In the finishing, inspection and shipping departments hand operated trucks with elevating platforms are used, to move the racks from one machine to another. All equipment requires instant and efficient attention. Repairs to the equipment should be done in one department and one man be held responsible. All machinists are not expert truck or crane repairmen. All hand trucks which carry loads of a ton or more should be equipped with roller or ball-bearing wheels. A company owes this much to its workmen. Too much thought cannot be given to the purchasing or building of equipment for intra-department transportation, whether it be cranes, trucks or conveyors of any type.

## Handling of Gas Coal

Our large forging furnaces are fired with gas coal and over each furnace is mounted a waste-heat boiler. In the yard the coal is dumped by means of a motor driven loader into steel buggies, which hold about one ton, have hinged sides, are mounted on roller-bearing wheels, and are drawn into the shop by a horse. The buggies serve as a coal bin at the furnace, the coal being shoveled from the buggy directly into the fire box. As soon as one buggy is emptied another is rolled into place, and by this method minimum space is used for the storage of coal within the shop.

In conclusion, the industrial executive usually knows how much per piece it costs to produce a given article, but rarely knows what it costs per unit to handle the materials entering into the manufacture of the article, or the cost of handling the finished article. As a usual thing, indirect or non-productive labor is charged to factory burden. A very large percentage of this labor is used in picking up and transporting material.

Any engineer wanting a good talking point in presenting to his management a new system on transportation should separate his old transportation costs from the general factory burden. Too much thought and time cannot be given to the selection of equipment that not only will show a saving, but fits into the general operating conditions of the plant and, at the same time, permits future extension and development.

C. J. Simeon's paper follows:

The function of a factory is to convert materials from one condition to some other condition, which usually includes the assembling of two or more pieces together. In order that these various operations can be performed, the raw or semi-finished material must be handled and stored during the various stages. This introduces a problem which requires a different solution in every plant (or at least in every industry), as it is mainly dependent on the kinds of materials used, and to a less extent on local conditions. The two extremes of this problem are illustrated by a mill producing a bulk product and a jobbing shop.

## Differences in Character of Output

In the case of a mill producing material in bulk, such as a flour or steel mill, the work is of such a repetitive nature that it pays to use highly specialized equipment for handling the material in process. As a result, a large proportion of the total equipment is merely for moving and storing the material and, as a

matter of fact, in both of these industries the material is not touched by the hand of the man during the entire manufacturing process.

In a jobbing shop the reverse condition is found. In this case it is seldom that two jobs are exactly alike, although similar jobs may follow each other with varying frequency. It obviously, therefore, would not pay to spend much money in special handling equipment, and we find even the most up-to-date plants, that are engaged in work of an irregular or special nature, are almost without any special equipment for handling their material. On the other hand, and for the same reasons, such plants require a more highly developed system for keeping track of materials, both in process and storage.

The Morgan Construction Co. more nearly approximates the second than the first example given above. The product is entirely custom-made, designed to order and consequently is very diverse in character and limited in quantity of any one kind of article at a time. For this reason the equipment for handling and storing material is of the simplest and most general kind.

Since the nature of the work prevents us from using conveyors to move material from one operation to another, it follows that every move must be made individually. This introduces the danger of a congestion or shortage of material at any one of perhaps several hundred points, unless each move is carefully planned and followed up. The manufacturing portion of the shop is divided as follows:

(a) Ground floor, consisting of bays 1 to 7, all approximately at street level. This contains the heavy machines and main assembling department.

(b) Bays 8 to 10, a few feet above the main shop level, contain machines and light assembling.

(c) The small machine and blacksmith departments are on the second floor, although not over either (a) or (b).

(d) The store room for finished small manufactured and purchased parts is located at the ground floor level, under (c).

### Reparation Awarded to Jones & Laughlin Steel Co.

WASHINGTON, May 9.—Awards of reparation, aggregating \$437,199, were made to the Jones & Laughlin Steel Co. by an order of the Interstate Commerce Commission last week on account of unreasonable and unduly prejudicial rates charged for the transportation of numerous carloads of iron ore and other commodities to and from the plant of the complainant at Woodlawn, Pa. The defendants include James C. Davis, Director General of railroads as agent and the Aliquippa & Southern Railroad Co., \$250,933; Aliquippa & Southern Railroad Co., Pittsburgh & Lake Erie Railroad Co., and the New York Central Railroad Co., \$137,490, and the Aliquippa & Southern Railroad Co., \$48,776. Awards of reparation to the amount of \$6,694 were ordered paid to the Texas Carnegie Steel Association, on account of unreasonable rates charged on shipments of cold rolled steel bars, polished bar iron, and shafting from Beaver Falls, Pa., and Cumberland, Md., to Galveston, Tex., via New York. The defendants include Director General Davis, the Pennsylvania Railroad Co., a number of railroad companies and the Atlantic Steamship Lines.

### Pittsburgh Basing Case Hearing

CHICAGO, May 5.—Through the testimony of E. W. Lawrence of Lawrence Bros., Sterling, Ill., manufacturer of builders' hardware, an effort was made before the Federal Trade Commission hearing on "Pittsburgh plus" to show that this practice originated about the time of the formation of the United States Steel Corporation. Mr. Lawrence said his firm had been in business since 1878 and that prior to 20 years ago steel was bought on a Chicago mill base, while during the last 20 years it has usually been bought on a Pittsburgh base, with freight to Chicago added. E. C. Litchfield of the Litchfield Mfg. Co., Waterloo, Iowa,

All materials entering the plant are moved as follows, in every case a record of their disposition being sent to the shop office:

(a) If stores or purchased parts, they are taken to the finished store room.

(b) If small castings or forgings, they are placed in the casting storage.

(c) If castings or forgings of large size, requiring a crane to handle a single piece, they are stored under one of the crane runways in Bay 3, 4 or 5, on the right side of the main gangway.

In the shop office are the production records and planning board, from which all movements of material within the factory are controlled. When the planning board finds that certain material will shortly be required to feed a given machine, a "move ticket" is made out and handed to the "move man," giving him particulars of the material and its present location, together with its destination. After making the desired move, this man signs the ticket and returns it to the planning board. The same process is repeated after each operation, until the completed work is finally delivered to the store room, if small in size, and to the assembly floor, if too large to be accommodated in the store room.

Owing to the diverse nature of our product, orderly methods of handling material are of greater importance than special equipment. We have practically no special equipment, in the sense of appliances intended to handle some particular piece in quantities, as for example: conveyors, elevators or special trucks. On the other hand, we are unusually well equipped with implements which, because of their simplicity, are well adapted to handling material which shows great variety in size, shape and weight. Every one of the ten bays has one, two or three overhead electric cranes. These, together with ordinary rope or chain slings and a few hand trucks, represent about all our handling equipment on the main floor. On the second floor, where the work is all rather small, there are a few light hand cranes, a few tote boxes and lifting platform trucks.

gave figures to show that on one agricultural implement \$2.67 is added by "Pittsburgh plus," but that manufacturer's and dealer's overhead brings this to \$6.58 by the time it reaches the farm.

Other witnesses before the commission were Paul Willis, president Kenwood Bridge Co., Chicago; John J. Duffin, Duffin Iron Works, Chicago; A. C. Johnson, Rockford Drop Forge Co., Rockford, Ill.; and E. F. Elcock, Hansell-Elcock Co., Chicago.

### La Belle Iron Works Plant Increases Open-Hearth Efficiency

La Belle Iron Works of the Wheeling Steel Corporation, Steubenville, Ohio, has taken definite action to increase greatly both efficiency and production of the open-hearth furnaces at its plant. One of the furnaces has been rebuilt after the McKune plan and 16 additional Chapman floating agitators with automatic feed are being installed. These 16 are in addition to four already in service, thus equipping a large portion of the gas producers supplying the furnaces.

Previously each furnace was supplied by four 8 ft. inside diameter hand-poked producers. As a result there was usually a shortage of gas. Now three producers equipped with agitators easily take care of each furnace, giving a uniform supply of high grade gas so essential to secure better furnace operation and increased production.

The labor of 1000 men for 267 years is estimated as what would be necessary to earn two years' fire losses, according to W. E. Mallalieu, president of the National Fire Protection Association, in an address at a convention of the society at Atlantic City on May 9. The figures are based on a loss in two years by fire of \$1,000,000,000 and wages at \$1.50 per hour and a 48-hr. week.

# American Prosperity Depends on Europe<sup>\*</sup>

## Destruction of Germany Would Have Disastrous Effects on the World—Plans for Re-establishing Sound Financial Conditions Presented

BY HAROLD G. MOULTON†

THE morning papers, in their accounts of the threatened collapse of the Genoa Conference in consequence of the signing of a treaty between Germany and Russia, reveal one phase of the European dilemma. France has all along been suspicious of the motives of both Germany and Bolshevik Russia, and has felt accordingly that no good could result from their participation at Genoa. France has, moreover, all along been fearful of just such a Russo-German alliance as is forecast in this treaty. Great Britain, on the other hand, under the pressure of economic necessity, has for more than a year been endeavoring to bring both Russia and Germany back into European councils and to work out with their co-operation some comprehensive program of European reconstruction. The Russians, starving because of economic isolation and the impotence of the Soviet regime, have apparently become willing to concede much in the way of communist principle, in order to make possible the economic rehabilitation of that gruesome country. The Germans, hard put financially, have hoped alternately for a relief from reparation pressure, and for a return of real prosperity, as distinguished from the present feverish activity, by the chance to exploit Russian industrial opportunities.

With these fears, doubts, hopes and aspirations they meet at Genoa to resolve their difficulties and bring order out of threatened chaos. What happens:—to date? The Russians are a little too smart and clever; and they anger the excitable Gallic temperament of M. Barthou and other French delegates—while Lloyd George attempts to heal the wounds of pride with oleaginous phrases. The Germans are snubbed, more or less, and after sucking their thumbs from Good Friday to Easter Sunday, they conclude that the Genoa Conference will do nothing for them, and thereupon they sign the Russian treaty drawn up weeks before in Berlin. The German view apparently is to beat the Allies to it in the exploitation of Russia, and let the Genoa Conference go hang, if need be.

### The Treaty with Russia

Unless the Germans have reached this final decision to abandon the Conference, their diplomacy is utterly stupid. The signing of the Russian treaty right under the very noses of the Allied delegates could not fail to anger—even the British representatives. I do not believe that German diplomacy—dense as it always has been—is quite capable of signing such a treaty unless the die has already been cast—unless Germany has decided to throw her lot with Russia and thereby establish a new European balance of power.

Such an outcome of the Genoa Conference would prove the worst possible outcome. In the long run, it would inevitably result in continuing the race for military supremacy, and it would make impossible the settlement of international difficulties in any other way than by the arbitrament of arms. What is of more vital significance, however, it might in the short run, in the very near future—so strengthen the hands of the extreme nationalist party in France as to lead to the long threatened seizure of the Ruhr industrial region with a view to preventing the economic recovery of Germany. German militarism was based on iron and steel. With Silesia controlled by France through Poland and the Ruhr controlled by French armies, would not the fangs of the German military monster be forever drawn? I personally doubt it, for chemical warfare is not fundamentally dependent upon Silesia

and the Ruhr: and the future of war lies with chemistry. But be this as it may, the seizure of the Ruhr has become an imminent possibility. It should be remembered in this connection that Germany has announced her inability to meet even the modified reparations demands and on this score alone there are many in France who have been urging the invasion of the Ruhr industrial area.

### Would Destroy Industrial Germany

It may be taken for granted that France could not effectively organize the production capacities of the Ruhr. The mere fact that they would be dependent upon German labor could make the job economically unprofitable just as has already been the case in the Saar Valley. The purpose of seizing the Ruhr is in plain terms to destroy industrial Germany and with it military Germany. In simple, cruel language, this would involve the starvation for emigration—to God knows where—of some 10 or 15 millions of German people whose very existence is dependent upon the continuance of German industrialism. I have heard this grim solution advocated by many men of high sincerity as the only permanent solution of the European problem.

Now my subject this afternoon has to do with the stabilization of Europe and the relation thereof to the United States—a problem rendered doubly difficult, as you will see by recent developments in the home town of Christopher Columbus. In the brief time at my disposal, I can in the nature of things touch only the high spots. But I shall endeavor (1) to show why the British policy of endeavoring to restore German and Russian prosperity is fundamentally sound from the point of view of the Allies; (2) To indicate the effects of European prosperity upon the material well-being of the United States and (3) To set forth the main issues involved in formulating an American foreign policy with reference to Europe.

Modern Germany—the industrial Germany was founded with the empire in the decade of the seventies—is the economic pivot of continental Europe. The evolution of the vast financial and economic organization of Germany during the last quarter of the nineteenth century and the early years of the twentieth, however disastrous the accompanying political developments, was primarily responsible for the remarkable economic progress during this period in all continental Europe.

### The Growth of Population

In the first place, the development of German industrialism alone made possible the phenomenal growth of population, within the confines of the empire, from 40 millions in 1870 to 68 millions in 1914—a growth of population, moreover, that was accompanied by a steadily rising standard of living. What this increase of population and of purchasing power meant to neutral and Allied nations cannot well be over-emphasized. Before 1870, Germany was a poor agricultural nation, largely self-contained. Then, within a single generation, Germany became a land of affluence, and a major purchaser of Italian, French, Belgian, Dutch, Scandinavian, British and American exports. German industrial life was so organized that a large percentage of the raw materials required for her industries were imported; and she was also a large importer of finished commodities, particularly of luxuries produced by Italy, France and Belgium.

While Germany, as a matter of course, exported finished commodities to the nations of eastern and southeastern Europe and also to the industrial nations of the West, German prosperity was, nevertheless, of

<sup>\*</sup>Paper read at convention of National Metal Trades Association, New York, April 19, 1922.

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the greatest benefit to other nations. Both Germany and other industrial nations thrive because of specialized production and exchange. The international trade—with emphasis on the *trade*—that developed between other nations and the puissant Germany of the generation before the war was mutually beneficial.

In the second place the development of financial Germany was the principal factor in increasing population and productive efficiency throughout all of Europe east of the Rhine. Germany, with Austria, financed the major part of the economic development that occurred in eastern and southeastern Europe in the latter years before the war. The economic life of this vast territory radiated from the financial offices of Berlin, Hamburg, Frankfurt, and Vienna. One of the most interesting chapters in the whole history of economic evolution is found in the remarkable union between German finance and German industry, both at home and in surrounding countries, that was developed in the heyday of the empire. We are not here concerned, let it be repeated, with the political consequences of this development. We are for the present interested only in its relation to the economic prosperity of Europe during the period when it flourished.

#### Organized by Germany

It was not alone through finance, moreover, that Germany organized, controlled, and developed the economic system of central and eastern Europe. German shipping and German commercial organization were almost as important. As the geographical heart of the continent, Germany was peculiarly favored in her development of the shipping lines and commercial connections with which before the war she directed the commerce of nearly the whole of central and eastern Europe to the borders of Asia.

To those who, still under the influence of war psychology, look for the re-establishment of European security and prosperity through the destruction of Germany, the answer is that such a process would inevitably spread its devastating effects throughout all Europe. It cannot be too strongly emphasized that the purchasing power of Germany, and through Germany the purchasing power of all central and eastern Europe, is essential not only to the prosperity of western Europe; but one may almost say it is essential to the perpetuity of the industrial life of highly developed nations such as England.

One might as well argue that it would have no adverse influence on New England and the central west of the United States if the Middle Atlantic group of states, including the commercial and financial centers of New York and Philadelphia and the Pittsburgh industrial district were to disintegrate economically, as to contend that it will benefit the rest of Europe if Germany goes the way of Austria and the Balkans, not to mention Russia.

England has clearly recognized the necessity of a prosperous Germany and through Germany of all of eastern Europe if her own economic existence is to be perpetuated.

#### Let Our Foreign Markets Go?

One still hears men say on every hand that whatever happens in Europe this great country of ours will not be seriously affected. Let our foreign markets go, if need be. It is urged that they are relatively unimportant anyhow; for our foreign trade is only 8 or 10 per cent of our total trade. Rather than grieve over the loss of foreign markets, let us confidently devote our attention to developing our home markets. Is not the consuming capacity of the American people limitless in extent? Think of the enormous numbers of people who still have no automobiles; think of the number if one must, who are still scarcely above the minimum of subsistence. Why worry about foreign markets when such vast potential demands are to be found within our own borders?

These are brave words, no doubt, but they are based upon fundamental misconceptions of the working of economic forces. Large and thriving domestic markets, unfortunately, depend upon foreign markets; they cannot readily be stimulated when foreign markets are waning. Moreover, it is altogether misleading to argue

that since our export trade as a whole constitutes only 8 or 10 per cent of our total trade, it is relatively unimportant. The truth of the matter is that practically 50 per cent of our total cotton supply is normally exported, and from 25 to 30 per cent of our wheat crop. In many lines of industry, our exports are altogether negligible; while in certain other important industries the export trade is of paramount significance. While one might argue with a show of plausibility that a 10 per cent loss of trade is not significant, he cannot argue with equal cogency when the per cent that is involved is 20 or 30 or even 50 per cent as in the case of cotton and copper.

It is idle to hope that our manufacturing industries—if shorn of their foreign markets—could, under the conditions prevailing, immediately devote their attention to the manufacture of goods for sale to the people of the cotton districts and to the wheat farmers of the West. Cotton and grain growers can purchase the products of domestic manufacture only when a strong foreign demand affords them a paying price for their products. And under a profit-making system manufacturers will produce goods for sale to farmers, or to anyone else, only when it pays to do so.

#### The War Period

During the war period, in consequence of the inordinate foreign demands for American raw materials and food-stuffs, producers of cotton and food enjoyed unprecedented prosperity; whereupon they proceeded to purchase, with an abandon never before equalled, the produce of American manufacture. The expanded domestic demand was definitely a result of the large foreign demand. The tide has now been reversed; and we shall not be able to expand materially our domestic sales in the agricultural regions of the South and West so long as the foreign demand for the produce of these regions continues to decline.

The point of this analysis is that since a decline in foreign demand may cause economic prostration in certain basic industries in the United States and since the effects of this are felt throughout the entire industrial system of the country, the loss of our foreign trade is of vital importance. A decline of foreign trade carries with it, for at least a considerable period of time, a decline in domestic trade.

The qualification, "for at least a considerable period of time," will be noted. The North American continent is undoubtedly economically self-sufficient; and it is large enough and diversified enough to permit an extensive geographical specialization in production. In the long run, we might, therefore, effect a vast reorganization of the channels of trade and of financial relations, and get on well enough without Europe. The trouble is that we are just now faced with the short run, which must be completed before we shall have an opportunity to engage in the longer jaunt. Our economic organization is adjusted, as a result of the trade and industrial evolution of the last hundred years, to trade with Europe. The process of reorganizing the industrial system on wholly independent lines would involve the gravest industrial consequences and require many years to accomplish. There is no escape from the conclusion that if American exports of cotton and wheat should be very greatly reduced as a result of European decadence, the cotton belt and the wheat belt would be seriously depressed for years to come.

#### Reduced Buying Power

The effects of reduced European purchasing power are already clearly manifest. Exports of manufactured goods of practically every kind have been tremendously reduced during the past year. Although the physical volume of exports of grain has been very large, nevertheless the price of wheat fell during the year of 1921 nearly 50 per cent. According to the closest observers, the European demand was always sluggish; purchases would be made only if the price were low. It may be pointed out, moreover, that the British export price to the continent fell much more than the American export price, thus indicating that continental Europe is the economic sore spot of the world. The recovery in the price of cotton in the late summer was due to the small supply rather than to the large demand.

The maintenance of imports is quite as essential to American prosperity as the maintenance of exports. The maintenance of American imports is, moreover, directly indispensable to the maintenance of American exports. Other nations can purchase our goods only if we purchase theirs in substantially like amounts. International commerce at bottom means swapping goods.

All nations, then, even the United States, will have to bear the industrial consequences if the process of economic and social disintegration in Europe, particularly central and eastern Europe, is allowed to run its fatal course.

#### The Fundamental Requirements

There are two elemental principles, which if kept steadfastly in mind, will contribute greatly to a sound solution of the present world problem. They are as follows:

(1) There can be no permanent improvement in any country unless there is an increase in production. It is self-evident that we cannot consume what has not been produced.

(2) There can be no great increase in production in any nation so long as international commerce is languishing. The existing economic system is international in scope; for good or for ill each nation depends for its material well-being upon thriving trade with other nations.

The crux of the problem therefore lies in the re-establishment of normal trade relations between nations—to the end that through specialized production and exchange the wealth of the world may be increased and the welfare of all classes promoted.

#### Means of Restoring International Trade

A consideration of the means of re-establishing trade naturally leads to certain controversial issues. The following are the fundamental problems involved:

- (1) Fluctuating exchange rates.
- (2) Trade barriers and restrictions.
- (3) The payment of reparations and inter-allied debts.

#### The Exchange Problem

The elimination of fluctuating exchange rates requires: (a) the restoration of the gold standard in Europe; (b) the balancing of European budgets; and (c) the balancing of exports and imports in the several countries. Let us see what each of these steps involves.

(a) The gold standard cannot be restored in many European countries without increasing the amount of the gold reserve. The United States and the European neutral nations now have huge supplies of gold,—supplies far in excess of trade or bank reserve requirements. Would not the restoration of the gold standard be facilitated if the excess gold of certain countries were loaned to the nations with depleted gold reserves? (It goes without saying, however, that this should be done only as part of a many-sided program of reconstruction.)

In many European countries it will be found impossible under any circumstances to redeem the huge volume of outstanding paper currency in gold at par. The redemption should be made at some fixed ratio, as 100 to 1, 1,000 to 1, or 1,000,000 to 1, depending upon the degree of inflation in the various countries.

(b) The balancing of budgets is necessary to a restoration of the gold standard and thus to a restoration of stable exchange rates. Government deficits require additional Government borrowing,—and this additional borrowing in many countries necessarily takes the form of legal tender irredeemable paper promises to pay. This increase of paper currency is accompanied by persistent depreciation, in terms of gold. The gold standard, if re-established, cannot be maintained unless budgets are balanced and all further issues of paper currency are consequently avoided.

A balancing of budgets in continental European countries can as a practical matter be accomplished only by a great reduction in expenditures. In most countries the tax burden is already very heavy in proportion to per capita income. High taxes would tend to impede rather than encourage enterprise. Expenses can be officially reduced only in the following ways, all

other means being of minor significance: (1) By decreasing military expenditures (2) by refunding Government securities at lower interest rates.

When it is known, for example, that the interest on the French debts now equals nearly 75 per cent of the total French revenues from taxation, and that the two items of interest (exclusive of that on the foreign debt) and military expenses alone now exceed the total revenue from taxation, it will be readily recognized that drastic curtailment of expenditures for these purposes is necessary.

#### Trade Barriers and Restrictions

Since the war there has been a return to a regime of trade control and tariff regulation comparable only to the situation during the so-called mercantilist era of the seventeenth and eighteenth centuries. Then the guiding principle of nations was to develop national power through a series of trade regulations and restrictions designed to promote manufacturing and to make the exports of every nation exceed the imports. While the utter futility of this has been repeatedly demonstrated, it has come to the front again since the war. Each of the new States of central and eastern Europe has been trying to render itself economically self sufficient—through trade embargoes, restrictions and tariffs; each has, however, merely succeeded in rendering itself economically impotent. Says the British Commercial Commissioner to Hungary of the States arising out of the former Austro-Hungarian empire, "It would seem that each State has determined to prevent the others from existing, even if it ruined itself in the endeavor."

Happily there has been some change of sentiment in central and eastern Europe during the past few months and trade treaties are now being negotiated. There is still much to be accomplished, however; and the necessity of permitting unrestricted trade is still to be fully recognized by the nations of western Europe and the United States.

This is not an argument for the establishment of free trade throughout the world. On the contrary, it is recognized that such a policy would be likely to produce a new chain of maladjustments and transition difficulties. But it is an argument against the artificial and destructive trade restrictions and barriers that have followed in the wake of the war.

#### The Reparation and Debt Problem

The arguments in favor of a substantial cancellation of the debts of European nations to the United States Government are as follows:

(1) Some 6 or 7 billions of the 10 billions of Government loans were made for war purposes at a time when that was the only way in which we could cooperate effectively in the struggle. That much of it, at least, should be regarded as a war cost—incurred at a time when the allied armies alone were holding the enemy at bay. It may be recalled in this connection that this money was largely spent in the United States in payment for war supplies purchased here.

(2) The remission of these debts would gain for us the good will of the world, a good will which in the long run would prove of incalculable practical benefit. The remission of the Chinese "Boxer" indemnity is evidence in point.

(3) The allied nations can pay us only by shipping goods here. The interest alone on the total of Government debts now amounts to about \$500,000,000 annually. To pay the interest would therefore require an excess of American imports over exports of \$500,000,000 a year. Private debts now owing us add about \$200,000,000 more to this amount.

The United States desires to increase exports. But as a practical matter if we require Europe to ship us \$700,000,000 annually in payment of interest on past debts and another \$300,000,000 annually, say, for reduction of principals, Europe's ability to purchase our current production will be reduced by a billion dollars annually, and our exports will decline accordingly. All who want to see exports maintained and increased should therefore stand for debt cancellation. So, also, with all those who believe in high protection for American industry.

(4) We cannot reduce the burden of taxes by requiring Europe to pay. The inevitable resulting curtailment of exports would intensify the business depression and thereby make a less total of taxes more difficult to meet than the present total. We were prosperous while the process of shipping Europe 10 billions of goods on credit was under way; we would be unprosperous if Europe were to pay us. The very fact that we have been seeking to devise means of continuing foreign credits "for the benefit of American business" suggests that prosperity here is not to be found in declining exports and expanding imports. With good business in this country our present taxes would prove less onerous than would taxes \$500,000,000 less, under conditions of serious business depression.

(5) The answer to argument number (3) in favor of making Europe pay is that we would make a more effective use of our power if we agreed to cancel the debt on condition that the allies undertake to do now what is regarded as necessary for the restoration of world prosperity. These debts will prove a valuable weapon of diplomacy only if they are actually used for bargaining purposes,—thrown into the pot, as a part of the general settlement. It would be impossible, for example, for us to induce France to let up on reparation demands if we were unwilling to reduce or cancel our debt claims.

(6) There is a final argument for cancellation. When a private debtor becomes so seriously embarrassed that it is apparent he cannot meet his obligations within any reasonable length of time, he is permitted to go through bankruptcy proceedings and start anew. It is recognized that this is sound policy even from the point of view of the creditor; for the bankrupt may in time become once more a good customer. Why should not the same policy be adapted between nations? Should it not be recognized that the nations of continental Europe cannot pay within any reasonable length of time; and that our interests, as well as theirs, would be promoted if we let by-gones be by-gones?

Such are the arguments for and against reparation and debt reduction or cancellation. Since the purpose of this memorandum is only to provoke thought and discussion, we express here no opinion on the merits of the controversy. It is deemed important, however, to emphasize one matter of policy. Granted that it may in the end be wise to cancel or reduce the war debt to the United States, it would certainly not be sound policy to do so at the present moment and unconditionally. We must await the proper time and then agree to cancellation or reduction *only on condition* that the European nations resolutely undertake to perform their part in the general settlement. Meanwhile we should be studying the problems involved so that there may be no unnecessary delay when the psychological moment arrives.

#### Outlines of American Policy

The United States Government has recently seen fit to refuse the invitation to attend the economic and financial conference called to meet in Genoa early in April. This refusal, I think it may be assumed, in no sense indicates a determination on our part to withdraw from participation in European affairs and to return to a policy of narrow isolation. The refusal is rather based on the conviction that the Genoa conference will not get down to the brass tacks of the situation and that in consequence our participation would be fruitless. It is believed that it is better to state frankly the American view that there must be a change of heart and of policies in certain countries of Europe before it will be beneficial for us to sit at European council tables. It is made clear, however, that when a new attitude shall have come to prevail abroad we shall be glad to co-operate in whole-hearted fashion in the solution of European world problems.

What now is our part in this program? When we sit in at a European conference, we shall, I think, be asked the following questions: (1) Will the United States cancel or reduce the European war debt in proportion as the Allies cancel or reduce indemnity requirements?

(2) Will the United States loan to Europe a substantial portion of her excess gold supply as a part of

the process of restoring the gold standard in Europe?

(3) If allied armies are reduced, will the United States join with Great Britain in guaranteeing France security from a possible future German attack? If not, will the United States join an association of nations designed to preserve peace, as well as to administer the economic settlements that are attempted?

Time does not permit me to discuss these several issues,—these basic elements in our future foreign policy as it relates to Europe. It is enough for the moment to state them, to call them sharply to the attention of the American people as the primary issues about which through honest and intelligent discussion we must make up our minds this year.

One thing, however, I would emphasize, namely, the necessity of dealing with the problem as a unified whole. We have had so many single panaceas since the war that it wearies one even to enumerate them: Thrift, hard work, foreign credits, bonds, deflation, stabilized exchanges, etc. It is certainly high time that we recognized that each link in the chain of economic and political relations supports every other. Just as unbalanced trade has helped to depreciate the exchanges, and as the depreciated exchanges in turn have helped to unbalance trade; just as unbalanced budgets have served to inflate the currencies, and in turn as currency inflation has increased the budgetary difficulties; just as the granting of huge loans to Europe has thrown the economic balance of the world out of gear, and as the attempt of European nations to pay debts and indemnities further unsettles international trade and financial relations—so also the return to international economic stability depends upon manifold factors. Stabilization of the foreign exchanges depends upon stabilization of domestic prices; stabilization of domestic prices depends upon controlling paper money issues; controlling paper money issues depends upon the balancing of budgets; and the balancing of budgets depends upon both economic and political stability in international relations.

#### Organization of American Construction Council

WASHINGTON, May 9.—Preliminary arrangements were completed here Wednesday, May 3, for the organization of the American Construction Council when Secretary of Commerce Hoover agreed to accept the chairmanship of the organization meeting to be held in Pittsburgh, June 19. Franklin D. Roosevelt, formerly Assistant Secretary of the Navy, has consented to accept the presidency of the organization.

The purpose of the council is to place the construction industry on a high plane of integrity and efficiency and to correlate the efforts toward betterment made by the existing organizations, through a conference association representative of the whole industry and dedicated to the improvement of the service which the construction industry renders to communities, States, and Nation.

#### India Imports Iron and Steel

Imports of iron and steel into British India in December, 1921, amounted to 46,510 gross tons, a decline of 4464 tons from the December imports in 1920, according to figures compiled by the iron and steel division of the Department of Commerce. Substantial increases in importation of corrugated and plain galvanized sheets and plates, steel bars and channels and pig iron are noted. The principal losses occurred in beams, pillars, girders and bridgework, sheets and plates, tin plate, and wrought tubes, pipes and fittings, which in most instances canceled the advances made in 1920 and brought the 1921 tonnages nearer those of 1919.

During 1921, imports of iron and steel into India totaled 513,592 tons. Great Britain supplied the bulk of every product, with three exceptions, the United States furnishing most of the wrought tubes, pipes and fittings, and Belgium leading in steel bars and channels and in wire nails.

# New Five-Stand Cold-Rolling Strip Mill

Tandem Mill of New Design Has Unusual  
Flexibility of Control—Electric  
Power a Feature

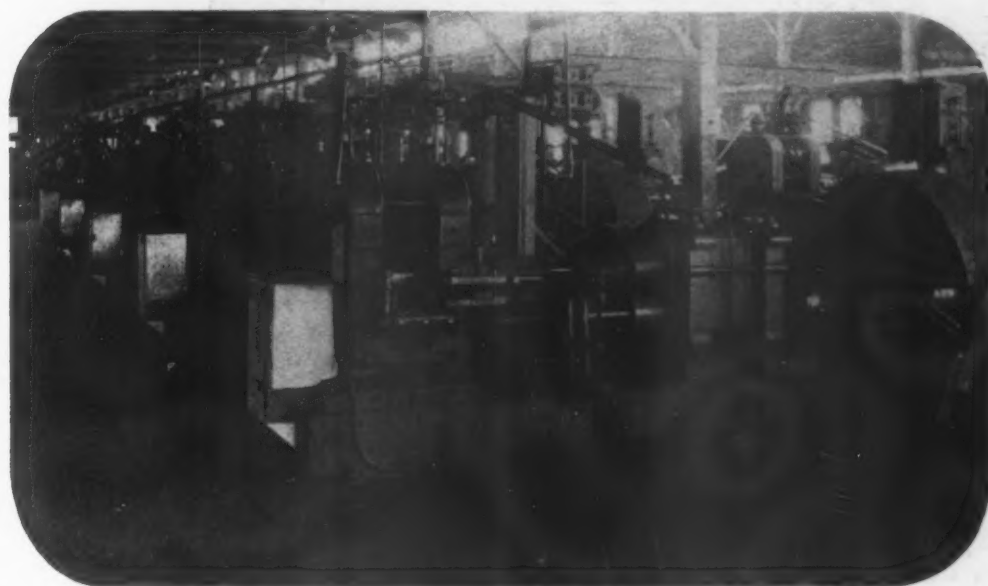
A NEW 10-in. cold-rolling strip mill, placed in operation recently by the Greer Steel Co., Dover, Ohio, is of unusual interest because it is a five-stand tandem mill and of a new design. The general practice in cold rolling steel plants is to use mills with not over four tandem stands. Previously one five-stand tandem had been built, but it is stated that its operation did not prove successful.

Designed and built by the Greer company, the predominating feature of the new mill is the flexibility of control, so that bastard drafts can be taken in case there is end to end variation in the gage of the coil being reduced. The flexibility is to a large extent due to the fact that each mill stand has its own gear ratio, this being provided to take care of any reduction that may be required. The drive is designed to avoid undue friction load. Extra long spindles, about twice the length usually used in mills of this type, connect the pinions and the rolls. The coupling between the pinion and the drive is a crab of special design.

the rolls; it is stated that the five stands can be changed in less than an hour. The mills are water cooled externally and internally. The spindle is supported on the center by a carrier that has tension springs.

The mill is electrically controlled through a field rheostat, having 200 points of control. Push button control is provided at a master panel on the wall near the mill, and there is also a push button station on the side of each mill stand. Each station has four push buttons, one for fast speed, one for slow speed and the other two for starting and stopping. The control of the master panel is so arranged that the stands can be operated in sets, stands one, two and three, and stands four and five being started or stopped in unison. While the mill is designed for roughing, it can also be used for finishing, in case the product does not require slitting.

In addition to the 10-in. 5-stand tandem mill, the cold rolling equipment consists of two stands of 8 in., driven by two 30-hp. A. C. motors; two stands



Front of the Five-Stand 10-In. Tandem Strip Mill, Showing the Long Spindles Connecting the Pinions and Rolls and the Wide Mill Housings. In the immediate foreground is the stand, for holding the coil of hot-rolled strip for passage through the cold-rolling mill

With one motor for each mill stand, the mill is driven by five 75-hp. direct current motors, having a speed of 600 to 1200 r.p.m. They are direct connected to the driving shafts through turbo flexible couplers. With separate mill gear ratios it is possible to take care of variations in the gage of the stock by bastard drafts, taking a heavy reduction on the first stand, light on the second, heavy on the third stand, and two light reductions on the last two stands, a reduction of from four to six gages being made from the first to the last stand inclusive. The separate gear ratios make these irregular reductions possible without any sag in the strip between the mill stands. In case there is no end to end variation in the gage of the coil of hot strip, fixed regular ratios of reductions are followed, as in the usual tandem mill practice.

While the first two stands are 15 ft. apart, the other stands are on 13 ft. 2 in. centers. The mill stands have 10 in. x 10 in. steel rolls. All gears and pinions are of the double helical type and machine cut. The mill housings are of width sufficient to permit changing rolls without taking out the corner bolts. Two nuts holding the housing side strips are loosened, and these strips are taken off and the top bearing is withdrawn, allowing both the top and bottom rolls to be taken out. This design permits a quick changing of

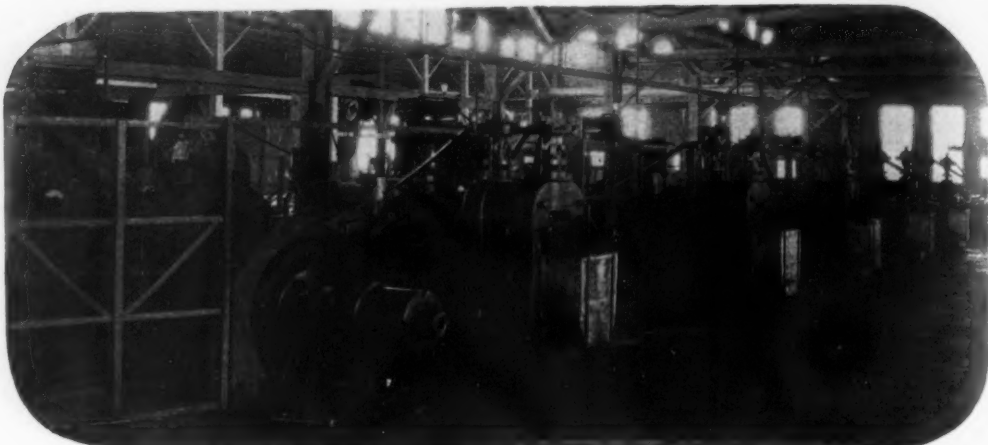
of 10-in., driven by two 50-hp. A. C. motors; two stands of 12-in., the second stand driven by a 150-hp. D. C. motor and the first stand by two 100-hp. A. C. motors; and two stands of 16-in. rolls, driven by two 250-hp. D. C. motors, all arranged tandem.

All direct current motors are variable speed, 250 volt. The alternating current motors are three phase, sixty cycle, 440 volt. Both General Electric and Westinghouse motors are used, all being located at the side of the mills. The mill equipment, outside of the five-stand 10-in. tandem mill, was built by Blake & Johnson, Waterbury Farrel Foundry & Machine Co. and United Engineering & Foundry Co., and is of standard design. These have Francke couplings between the motor and drive shaft. The 8-in. and 10-in. mills are operated by friction clutches.

At the end of each roughing and finishing stand is located an electrically-operated coiler, driven from the shaft of the mill motor. The 10-in. five-stand mill has an 18-in. drum coiler of the collapsible type, this collapsing  $\frac{1}{2}$  in. The 16-in. roughing mill has a 16-in. coiler built by the United Engineering & Foundry Co.

The plant is arranged for convenient and economical production, the material moving from one end of the building toward the other during the various operations. The 10-in. five-stand mill and the two 16-in. roughing

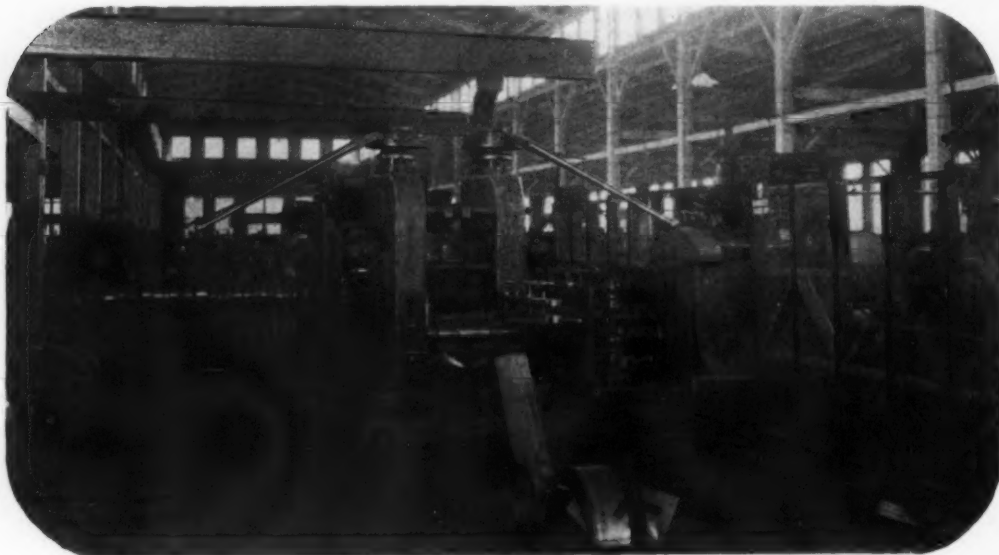
Back of the Five-  
Stand 10-In. Tan-  
dem Strip Mill,  
Showing at Left the  
18-In. Drum-Type  
Collapsible Coiler.  
Along the roof  
trusses may be seen  
a portion of the ven-  
tilating and cooling  
equipment. A con-  
trol panel for the  
mill shows through  
the screen at left



stands are located at one end of the mill building, and the finishing mills are toward the opposite end. A slitting machine, near the center of the plant, is located between the roughing and finishing mills. Near the slitter is a scrap bundler, furnished by the Stanley

lower end of the plant, back of the finishing mills. These machines were supplied by Blake & Johnson and the Waterbury Farrel Foundry & Machine Co., the latter company also supplying the slitting machine.

Coils of hot rolled strip steel are delivered on rail-



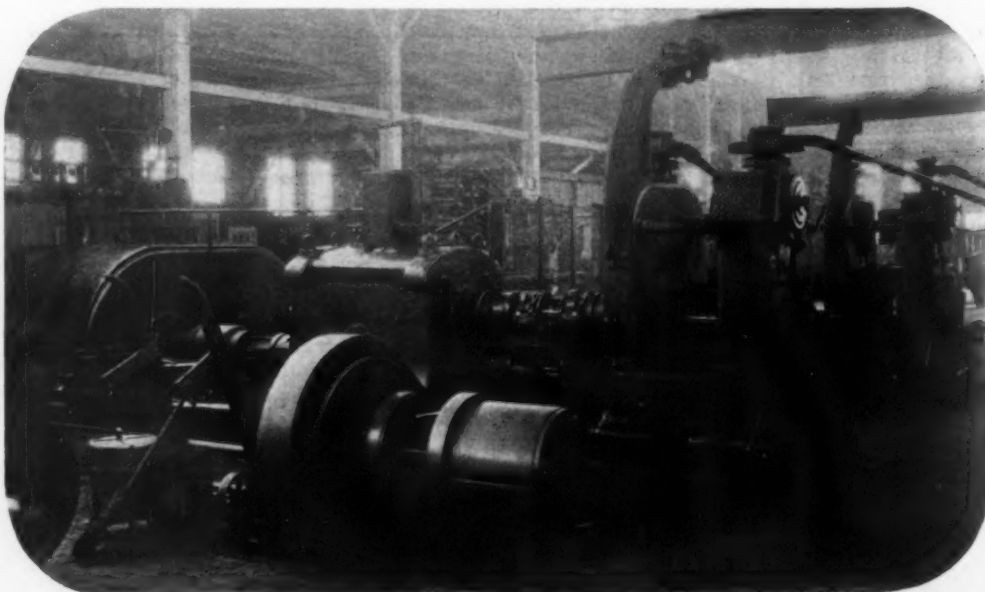
Front of the Two-  
Stand 16-In. Rolls,  
Furnished by the  
United Engineering  
& Foundry Co. A  
coil of hot-rolled  
strip is shown,  
ready to be entered  
into the first pass  
of the mill. Over-  
head are the mono-  
rails for handling  
rolls into and out  
of the mill hous-  
ings, each rail be-  
ing supported on its  
housing

Works, which rolls up into bundles the narrow pieces of scrap as they are removed from each side of the strip as it goes through the slitter.

In usual practice the steel goes from the roughing stands to the slitter and then to the finishing mills. Finished strips which are not to be shipped in coils are flattened and cut to length on two electrically operated flattening and cutting machines located at the

road cars in the stock house, where they are handled by a 3-ton electric crane equipped with a lifting magnet. The crane delivers the coils to a drum type recoiler on which the coil is loosened up, causing a removal of much of the scale. From the recoiler the coils are placed on wood racks on a gravity conveyor having sufficient incline to permit them to be pushed into the adjoining pickle house. Here a 3-ton crane lowers the

Rear of the 16-In.  
Stands, Showing  
Collapsible Coiler in  
Foreground. The  
large gear box and  
the pinion set, be-  
hind the coiler, give  
some indication of  
the power require-  
ments of this mill.  
This view shows  
clearly the method  
of support of the  
monorail on the  
mill housing



Strip Steel Is Annealed in Three Double Annealing Furnaces Fired with Producer Gas. A 20-ton electric traveling crane, equipped with a lifting magnet, is used for handling material to and from the annealing bottoms, which are run on the balls shown



coils into the pickling tanks. They are handled into and out of these tanks with Monel metal hooks, this metal being used because of its acid resisting qualities. There are two acid tanks, two cold water tanks and a soap tank. Cutting compound is used in the soap tank in order to keep the steel from rusting after it leaves the cold water and before it reaches the mill. From the pickling department the coils are taken to the mill building on hand trucks.

The annealing department is equipped with three double annealing furnaces of the Swindell type, heated by gas from two Swindell gas producers. This department adjoins the lower end of the mill building, from which steel is brought on hand trucks. Each annealing furnace has a Bristol and a Brown recording pyrometer, one instrument serving as a check against the other. The annealing department is served by a 20-ton crane, using a magnet for handling the coils to and from the annealing bottoms. All the crane equipment was supplied by the Pawling & Harnischfeger Co., Milwaukee. The magnets are of Cutler-Hammer make.

Annealing practice depends on the requirements of the customer. All soft steel is annealed. Some hard steel has to be given an intermediate tempering in the

annealing furnaces during the rolling, owing to the increase of the hardness during reduction.

The plant includes the stock house, 42 x 200 ft.; the mill building, 120 x 320 ft.; annealing department, 100 x 132 ft.; and pickle house, 32 x 76 ft. The annealing building is a steel structure and the other buildings are of concrete blocks.

Electric current for the plant, supplied by the Ohio Service Co., is delivered at 15,000 volts and stepped down to 2,300 volts on a main transformer and to 440 volts on a secondary transformer, both supplied by the Allis-Chalmers Co. Direct current power is furnished by a 360-kw. and a 500-kw. General Electric motor generator set. A machine shop equipped to handle all repair work is located in one corner of the mill building. The five-stand tandem mill was built in this shop.

The plant, which has a capacity of 1500 tons per month, is equipped to make strip steel from  $\frac{3}{8}$  in. up to 16 in. in width and 0.010 in. in thickness and heavier. Occupying a 50-acre site, it is conveniently located geographically in respect to a large consuming trade. Being on the lines of both the Pennsylvania and the Baltimore & Ohio Railroads, it has good shipping facilities.

## IDENTIFYING SPECIAL STEELS\*

### French Thermoelectric Method for Classifying Various Alloy Steels—Apparatus Used

At the meeting of the French Academy of Sciences on Feb. 6, M. Chatelier presented a note from M. Galibourg on the subject of identifying special steels thermoelectrically. An abstract follows:

The Brinell hardness test is usually sufficient for the identification of ordinary steels, but for special steels this test will not always provide identification, as sev-

eral different steels have the same hardness. This consideration has led to an investigation to discover a method of classifying steels in an order different from that of hardness but applicable, like the Brinell test, to each piece individually.

A large number of tests have been made with the

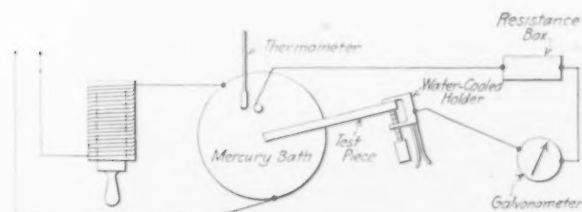


Fig. 1.—Plan of the Apparatus Used to Identify Special Steels by Thermoelectric Method

eral different steels have the same hardness. This consideration has led to an investigation to discover a method of classifying steels in an order different from that of hardness but applicable, like the Brinell test, to each piece individually.

Fig. 1 shows in diagram the method, based upon the utilization of the electromotive forces of contact, employed for this purpose. A bath of mercury is heated to the temperature required by an electrical resistance. A wire of electrolytic iron is plunged in the mercury and is connected at its other extremity to the binding

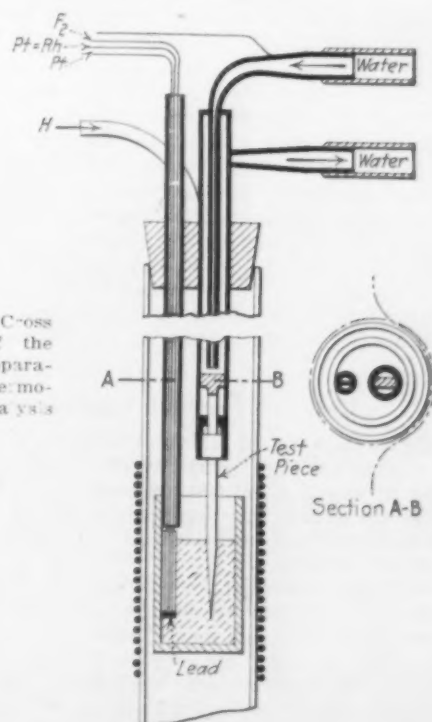


Fig. 2. — Cross Section of the French Apparatus for Thermoelectric Analysis

\*Abstracted from *Le Genie Civil*, March 11, 1922, by J. H. Blakey, 1703 Crilly Court, Chicago.

object of determining the thermoelectromotive force produced under these conditions by different kinds of ordinary and special steels, at temperatures ranging from 20 to 320 deg. C. For the higher temperatures the mercury was replaced by lead. Fig. 2 shows the apparatus used in making the tests. The following are

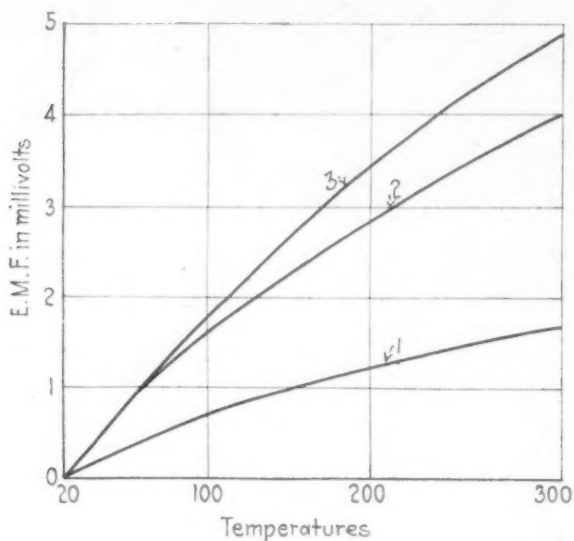


Fig. 3.—Some of the Results of the Method on Nickel Steel

some of the results obtained with different kinds of steel:

Carbon Steels					
Carbon, Per Cent	Manganese, Per Cent	Silicon, Per Cent	Thermoelectric Force at—		
			120° C.	200° C.	300° C.
0.03	0.18	0.06	0.10	0.25	0.30
0.29	0.47	0.19	0.60	0.90	1.20
0.55	0.26	0.28	0.65	0.95	1.20
1.10	0.43	0.43	0.90	1.30	1.80

Silicon Steels					
Carbon, Per Cent	Manganese, Per Cent	Silicon, Per Cent	Thermoelectric Force at—		
			120° C.	200° C.	300° C.
0.21	...	0.93	1.20	1.65	2.50
0.18	0.27	1.60	1.55	2.40	3.20
0.42	0.56	1.92	1.70	2.55	3.35

Nickel Steels						
Carbon, Per Cent	Mangan., Per Cent	Silicon, Per Cent	Nickel, Per Cent	Thermoelectric Force at		
				120° C.	200° C.	300° C.
0.08	0.34	0.13	2.15	0.8	1.25	1.70
0.12	0.01	0.05	5.23	1.8	2.80	3.85
0.12	0.12	0.05	7.13	2.1	3.40	4.80

Chromium-Tungsten Steels						
Carbon, Per Cent	Chrom., Per Cent	Tung., Per Cent	Vanad'm, Per Cent	Thermoelectric Force at 120° C.	200° C.	300° C.
0.76	4.28	8.39	1.30	0.05	0.15	0.10
0.50	4.15	13.43	0.17	0.20	-0.15	-0.65

Tempering is found to have very little influence upon the form of the curve given by any steel. For example:

	Annealed		Tempered	
	E.M.F. at 120° C.	E.M.F. at 300° C.	E.M.F. at 120° C.	E.M.F. at 300° C.
Carbon steel .....	0.50	0.95	0.55	1.15
Chromium-tungsten steel	0.25	-0.25	0.25	-0.35

This peculiarity makes it unnecessary to subject test pieces to any special treatment. Fig. 3 shows the form of curves given by nickel steel.

The differences in the E. M. F. given by the different steels at 120 deg. C. is thus sufficient to arrive at a classification of the ordinary and special steels in an order other than that given by the Brinell test.

### Call for Former Employees

KALAMAZOO, MICH., May 6.—Fuller & Sons' Mfg. Co., maker of high grade truck transmissions, have orders in excess of \$1,000,000 booked and in an effort to keep up with production schedule, W. A. Clark, factory manager, has issued a call for former employees to return to work.

"We have increased the number on our payroll from 100 to 200 in the past two weeks," said Mr. Clark, "and can use easily 200 more men at once. During the period of greatest activity, we employed over 800 men and produced 750 transmissions each week. We must get on a 500 weekly production basis as soon as possible."

### Testing Materials Meeting in June

The provisional program of the annual meeting of the American Society for Testing Materials, which is to be held in the week of June 26 at Chalfonte-Haddon Hall, Atlantic City, N. J., provides the following sessions:

Non-ferrous metals, metallography and corrosion, Tuesday, June 27, at 9:30 a.m.

Wrought iron, cast and malleable iron, Tuesday, June 27, at 3 p.m.

Steel, Wednesday, June 28, 9:30 a.m.

Impact testing of materials, Wednesday, June 28, 8:30 p.m.

Fatigue of metals, methods of testing and nomenclature, Thursday, June 29, 9:30 a.m.

There will also be sessions on coal, coke, timber, shipping containers, concrete, preservative coatings, petroleum products and the like. The presidential address and the reports of committees are scheduled for the evening session of June 27.

Some of the special features of the meeting, as phrased in the Society's bulletin, are as follows:

**Steel Castings.**—The study of physical properties of steel castings and the preparation of specifications for railroad castings have jointly engaged the attention of our Society and the American Railway Association for over two years. Important data obtained during that period will be presented.

**Effect of Sulphur on Rivet Steel.**—A report of an extended investigation under the auspices of a representative joint committee.

**Impact Testing of Materials.**—The Wednesday evening session is devoted to a symposium on this subject, which is becoming of increasing importance in the testing of materials.

### Officers Nominated

The nominations for officers are as follows:

For president, Dr. George K. Burgess, chief of the division of metallurgy, Bureau of Standards, Washington.

Vice-president, W. H. Walker, professor of chemical engineering, Massachusetts Institute of Technology, Cambridge, Mass.

For new members of the executive committee, D. M. Buck, metallurgical engineer, American Sheet & Tin Plate Co., Pittsburgh; W. M. Corse, division of research extension of the National Research Council and consulting engineer International Nickel Co.; W. K. Hatt, professor of Civil Engineering, Purdue University, Lafayette, Ind., and J. R. Onderdonk, engineer of tests, Baltimore & Ohio Railroad, Baltimore.

The Society is planning to issue a volume of the proceedings for the years 1913 to 1920, a book of 250 pages. The society is also considering the holding of two meetings per year, one in the Central West in view of the fact that the center of gravity of the society membership is in eastern Ohio, about 50 miles southeast of Cleveland.

### Committee on Corrosion of Non-Ferrous Metals

A new standing committee has been organized on the corrosion of non-ferrous metals and alloys. The chairman of the committee is E. C. Lathrop, of the E. I. du Pont de Nemours & Co. The vice-chairman is W. D. Richardson, Swift & Co., and the secretary is Sam. Tour, Doehler Die Casting Co., Brooklyn. The committee has appointed as its representative on the general corrosion committee of the National Research Council W. H. Bassett, American Brass Co.

The Society's committee on steel is undertaking the preparation of standard specifications for steel shafting, with the idea of establishing through co-operation with the American Society of Mechanical Engineers of an American standard for steel shafting.

### Chicago Foundrymen's Club

The Chicago Foundrymen's Club will hold its last meeting before the summer recess on Saturday evening, May 13, at the City Club, Chicago. The program will comprise a number of entertainment features. Consideration will also be given to the formation of a committee to study the feasibility of classifying molding sands according to bond, fineness and silica content. This would carry forward the work initiated by Eugene Smith, the Crane Co., Chicago, who has read papers on the subject at the past two meetings of the society.

# Financial Efficiency in Manufacturing

Keeping the Investment Down—Material, Equipment and Other  
Factors Outlined—Production Chart Guide to Purchasing—  
When to Make or to Buy Parts\*

IN laying out a factory for the manufacture of a certain article and in planning for the subsequent operation of that factory, the duties of the engineer are manifold. He must first of all design the entire system so that it will work with reasonable continuity, and then with the best possible economy. The problem of keeping investments down resolves itself into the problem of attaining and maintaining the greatest possible economy or, to use engineering terms, the attainment of the maximum financial efficiency.

Applied to a manufacturing plant, the points of attack are five in number. To visualize these points of

tems themselves should be made the subject of investigation to determine whether or not these functions, which control the other functions of manufacturing, are themselves operated at the best financial efficiency.

In what follows the problem is discussed in the order in which the various functions have been given in the formula, namely, burden, labor, material and equipment.

Obviously, the measure of efficiency in any case is a comparison of actual performance with standard. A proper classification and segregation of the items which go to make up burden is one of the important features of the design of a good cost system. The determination of standard burden is, of course, a difficult problem and can be arrived at only after considerable study of the

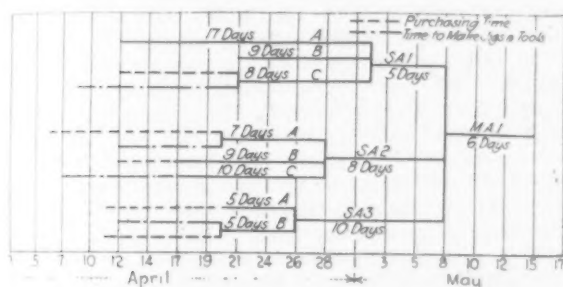
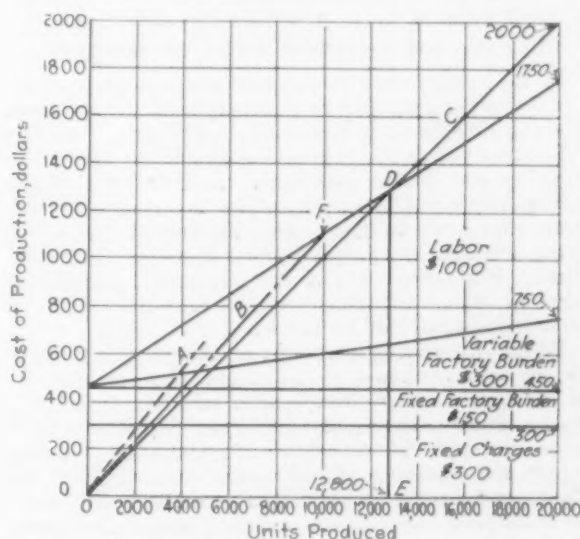


Fig. 1 (Above) Shows Graphic Production Control Chart. The schedule of importance is: Most important purchase, SA1A, April 6; most important part, SA1A, April 12; most important jig, SA2C, April 7.

Fig. 2 (at Right)—The Chart Shows That, with Over 12,800 Units Per Year, It Will Be Cheaper to Make Than to Buy (Line DE). With requirements of 10,000 per year, the purchase cost equals the manufacturing cost (point F). The machine costs \$2,000. The standard hours per year are 2,000 and the capacity production per year 20,000. The purchase prices are 13c., 11c. and 10c., lines A, B, C, for under 5,000 units, 5,000 to 10,000 units and over 10,000 units respectively. Materials to be furnished by the purchaser.



attack and also to express the financial efficiency in terms of the factors which control it, the formula is advanced as follows: The financial efficiency is the result of the product of the efficiency in the use and design of the various elements of manufacturing processes, namely, material, equipment, labor, burden and sales and administration which may be expressed,  $E_p = E_h \times E_l \times E_m \times E_e \times E_s$  and  $a$ . This paper covers the first four of these functions.

Problems which arise in these connections, particularly those having to do with equipment and, to a lesser degree, materials, could very well be called problems in financial engineering.

The problems of financial engineering divide themselves into two parts, classification of cost and analysis of cost. The first, as mainly a matter of record keeping, will not be discussed further. The analysis of cost deals with the utilization of the data obtained from the classification of cost used in connection with engineering knowledge, for the purpose of determining whether or not the plant is operating at best financial efficiency. This applies not only to plants or systems already in operation, but also to those which may be proposed.

## Reliable Data Necessary

It naturally follows that the best results can be obtained only where accurate, reliable data are available. This means that well designed production and cost systems must be installed, since only through these can we obtain the data upon which our conclusions must be based. The operation of the production and cost sys-

situation and proper analysis of all the expenses which compose it. However, it is possible to establish standard expenditures for such burden items as repairs, supplies, indirect labor, and similar expenditures.

In considering burden it must also be remembered that fixed charges constitute one of the elements, but since these are based upon the cost of plant and equipment, it will be taken up later in the discussion on the efficiency in use and design of equipment.

Having done this, the classification and collection of records in the proper manner should show up the efficiency automatically each month in a form of the statement given below. The measure of burden efficiency is the ratio of the burden variance to the standard burden.

## Statement of Burden

	Standard Burden	Actual Burden	Earned Burden	Burden Un-earned Vari-ance
Fixed charges.....	\$360	360		
Indirect labor.....	1,050	1,275		
Supplies.....	300	350		
Repairs.....	125	100		
Miscellaneous.....	80	80		
Total.....	\$1,915	2,145	1,750	230 395

Burden efficiency is therefore  $1915 \div 2145$  or 89 per cent.

## Keeping Down Investments in Labor

From the accounting point of view, the moneys expended for labor are reflected in the values of inventories of work in process and finished stock, and therefore the problem of keeping investments in labor down immediately is reflected in the values of those inventories.

The points of attack against this phase of the problem are well known. The installation of time-study methods to analyze all jobs performed, and the in-

\*From a paper "The Relation of Investment to Production," read by H. R. Boston, production engineer, Scovell, Wellington & Co., before the Society of Industrial Engineers, New York chapter, April 11.

stallation of task and bonus or other incentive wage payment plans, constitute the means at hand for the solution of one of the most vexing problems in manufacturing. Added to these must also be the proper selection of the man for the job, aided by competent supervision, planning and control of labor activities.

Whatever wage plan is selected as the most feasible to meet the conditions, certainly the records of performance kept should show whether or not the employees have attained the various standards set for them. The percentage of employees who have accomplished this would therefore represent the percentage of labor efficiency attained.

There is still another angle to this problem to be considered: while each individual employee may be attaining standards which have been set for him, the efficiency of the group as a whole may not be great. This, of course, should start an investigation into the method of manufacture, with a view to betterment and improvement.

The remarks regarding labor and burden are a reiteration of general principles and knowledge with which many are familiar. Perhaps the most fertile field for pioneer research is in the control, selection and design of equipment, and also the control, selection and design of materials entering into the products manufactured.

#### Materials and Equipment Fields for Research

No real results can be obtained without proper control of materials in their various stages of manufacture, from the raw stock to the finished product. This immediately involves the purchasing as well as the manufacturing and design functions. In industries of the continuous-process type, where the investment in materials represents in many cases the largest proportion of cost, the need for proper control of materials is most urgent. However, it is not less important, proportionately, in other industries where material forms a smaller proportion of total cost.

To help in solving problems arising in this connection, we have various devices at hand. The accompanying production chart, Fig. 1, is a schedule of what is called a minor assembly of a large gas engine, and illustrates the general principle of production control, namely, the planning of production starting from the finishing point rather than from the starting point. Since this chart shows exactly when certain materials or parts are wanted, it serves as a guide to the purchasing department as well as the manufacturing department, so that their program of purchases may be arranged to keep the investment in raw materials at the lowest possible point.

This means of production control helps to solve one of the purchasing agents' most difficult problems arising within the plant. It is, of course, recognized that the problems with which the purchasing agent has to deal, arising without the plant, such as the rise and fall of prices and the fluctuation in supply and demand, constitute an important and difficult problem.

Having determined the best time for making purchases of material and, by the same means, that is, proper production control, the quantities to be purchased, the next problem is the determination of quantities of parts or pieces that should be manufactured, so that the investment in work-in-process inventories shall be a minimum.

#### Work-in-Process Inventories Held to Minimum

Conditions surrounding the manufacture of the parts or pieces mentioned are entirely within control of the engineer, and the problem can be reduced to mathematical terms. By the use of simple reasoning and the aid of differential calculus, we arrive at the following solution of the problem:  $X = \sqrt{\frac{2(MS + RQS)}{RC}}$ , in

which  $X$  = lot quantity;  $C$  = cost per piece, not including set up;  $M$  = yearly requirements;  $S$  = cost of set up;  $Q$  = minimum quantity kept in stock consistent with safety;  $R$  = interest rate.

The principles and methods cited can be applied advantageously in the control of work-in-process in-

ventories. The advantages of such methods of investigation and analysis, in helping to keep investments down and obtaining the best financial efficiency in the use of materials, are quite obvious.

Regarding inventories of finished product, it is recognized that their control is quite simple as far as mechanical handling and methods of control are concerned. Starting from this point however and working backwards, it is readily seen that the keystone of the entire material situation rests upon the rate at which the finished product can be disposed of.

#### Equipment the Most Difficult Problem

Without question the most difficult problems in financial engineering arise in connection with the proper selection and design of equipment. The complexity of the problem varies materially with various industries, and has in the past found its most frequent applications in the designs of power plants for public utility work. This phase of financial engineering has been given a great deal of attention by engineers working in the public utility field, but to my knowledge, the same principles have been only sparsely applied and used in connection with the design and selection of equipment used in manufacturing plants. The reason for this is found perhaps when we consider that a large proportion of our manufacturing plants are like "Topsy," they "just grew." The future field of research in these lines is enormous and involves many problems admittedly difficult of solution.

In a general way, the relative importance of problems of this nature may be placed upon two planes. In the continuous-production type of industries, problems in selection or design of equipment constitute the most important factor. In the jobbing industries they constitute a less important feature. The line of demarcation in many cases is not well defined and our decision, as to whether or not an investigation of this aspect of the problem would be profitable, must depend entirely upon the engineer's judgment in the particular case under review.

No piece of equipment is operating at the best possible economy unless it produces all which it is designed to do and, furthermore, is in operation for the full number of working hours decreed by the industry in which it is used. It is, of course, recognized that failure to use any piece of equipment may not be because of any fault in the equipment itself, but rather fault in the management due to failure to provide workmen or material. Losses due to these causes certainly should be charged against the management and not against the cost of manufacturing.

#### Determining When to Make or Buy a Given Part

We are familiar with the situation which arises when the executives of a company get together to decide on manufacturing and purchasing policies. It is perhaps decided that a certain part will be purchased from another manufacturer, but upon receipt of estimates or quotations everyone is astounded at the presumably high price. Without much further thought, the management decides that it can manufacture that part cheaper itself, and goes ahead to purchase the necessary equipment to do this. If a careful investigation had been made, in many cases the results would have been the opposite. One simple and easily applicable method is by means of the chart in Fig. 2, which shows the total cost of operation of such a piece of equipment under various conditions of manufacture. This chart can be applied not only to each piece of equipment but to the shop as a whole or the individual departments.

The Edgar Thomson Steel Works of the Carnegie Steel Co., Braddock, Pa., brought the 300 men of the blast furnace department and the 130 men in the splice bar division through the year 1921 without a lost-time accident.

Two hundred men have been added to the working force of the Rolls-Royce Co. of America plant in East Springfield, Mass., the past week, making a total of some 600 workmen now employed. The company reports good prospects.

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ESTABLISHED 1855

# THE IRON AGE

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## Bolshevism Then and Now

In the report on the steel strike of 1919, issued by the Commission of Inquiry of the now defunct Inter-Church World Movement, it is stated that many steel company officials were interviewed, but that none presented any evidence of Bolshevism. The report, page 33, quotes Chairman Gary as insisting to the commission that the strike aims were the closed shop, Soviets, and the forcible distribution of property, and it is added that Mr. Gary "warned the commissioners to remember that any statement that they might make about the United States Steel Corporation and the strike should be gravely considered, inasmuch as the foundations of the United States Government were involved." President Buffington, of the Illinois Steel Co., is quoted as indorsing Judge Gary's Bolshevik theory of the strike. Then the report proceeds to discuss William Z. Foster and others who were active in the strike and declares that that movement was merely an "old-fashioned" strike and that the cry of Bolshevism was not only a "fraud on the public," but a "dangerous thing." "There was," said the report, "baseless excitement over Bolshevism." Foster's organizing abilities are praised and he was described as "a large-scale promoter," instead of "a small salesman." The red book, "The Syndicalist," with its advocacy of bloodshed and murder, was lightly dismissed, except so far as its circulation by opponents of the strike was concerned. That was vigorously denounced.

It may also be recalled that, throughout the strike, the president of the American Federation of Labor was standing with Foster, not because he wanted to, for there was no love between the two, but because he did not have the courage to oppose him. Other labor leaders were also lined up with Foster and all of them indorsed the strike.

Now, after the lapse of less than three years, President Gompers comes out with violent denunciation of Foster, charging him with being associated with the Bolsheviks of Russia, and declares that it is Foster's determination to turn labor over to Bolshevism. Here is an excerpt from Mr. Gompers' comments:

In Chicago I accused him of being the agent of Lenin and Trotsky, with whom, according to his own statements, he had most cordial relations while in Rus-

sia. In his present work, he is carrying out the proclaimed policy of Lenin of destroying all democratic governments. As a condition precedent to destruction of our Government, he decreed the destruction of the American Federation of Labor. He calls his program "boring from within." That is what pirates do when they wish to scuttle a ship.

In the May number of the *American Federationist*, several pages of editorial, entitled "Another Attempt at Soviet Dictatorship Unmasked," are published, and it is explained that the American reds have been in consultation with Lenin and others, and now propose to disrupt and destroy the American Federation of Labor and ultimately the Government of the United States.

Up to date the good bishops and others connected with the unlamented Inter-Church World Movement have not been heard from and it has not become known whether they have changed their views, and now, like Mr. Gompers, have come to agree with those who denounced Foster in 1919. However that may be, the unfair report and the failure of Gompers to take the position which he should have taken in 1919 are now being shown in their true light. If Foster and his associates are trying to disrupt the American Federation of Labor, the federation has no one but its own leaders to blame. The attention of President Gompers was called to the real facts in the case by THE IRON AGE early in September, 1919, before the strike was called, and he was appealed to to prevent the strike, as he could have done, but he remained silent, and afterwards defended the strike at the Congressional investigation at Washington and elsewhere. He is now reaping the results of his own cowardice.

The rising tide in British steel exports carried the March movement to the highest point reached since July, 1920. At 311,654 tons, the March figures, analyzed elsewhere, were about 75 per cent of the pre-war or 1913 monthly average and over twice the monthly average for 1921. They were also more than 100,000 tons larger than the American exports for the same month. Nearly 130,000 tons of the March total was in rails, galvanized sheets and tin plates, products in which world consumption has made rapid strides of late. British steel exports have increased practically five-fold

from the low point of last summer, as compared with less than three-fold for American exports in the same time. Scarcely less noteworthy is the downward trend of British steel imports. The sharp decline continued in March until the total was less than for any month since early in 1920. German and Belgian exports to Great Britain are in marked contrast with those of a year ago.

### Steel Trade Prosperity

That the steel industry has entered upon another of its periods of activity is obvious. The change came rapidly. Steel production since April 1 has been at more than three times the rate of last July and at nearly double the rate of last December, the production being entirely for the filling of actual orders. Current output is well in excess of the highest attained before the war. In both 1912 and 1913 the two best pre-war years for tonnage, the output of steel ingots was a shade over 30,000,000 tons, while the capacity at the end of 1913 was in the neighborhood of 35,000,000 tons. Production in the past few weeks has been at the rate of 35,000,000 to 36,000,000 tons per year.

It is true that the present demand and production do not represent as large a percentage of existing steel producing capacity as used to be called on before the war when the steel industry was regarded as really "active," for the rate of operation appears to have averaged between 70 and 75 per cent since April 1; but it is the common view that production could not be swelled much more at this time, on account of the coal strike. The steel industry used to run approximately at its capacity when it had the orders, but in recent years it has been unable to do so. In the first nine months of 1920, when orders were going begging and fancy delivery premiums were being paid, the production was only about 80 per cent of what was reckoned the "capacity."

As usual, there is divergence of opinion as to how long this steel trade activity will "last." Guesses range from several months to several years. It is uncertainty of that sort that has helped to make the steel industry one of the most interesting of all industries.

A point that needs to be emphasized is that the history of the steel industry shows that activity and profits are not synonymous, because periods of activity and periods of fair profits have not been synchronous. With a revival, there has always been a spell during which the mills were filling old orders yielding them little profit. Afterwards the mills book orders at better prices and make money. Apart from the war time, the longest period of activity in steel was the three-year period from late in 1904 to late in 1907. During the first twelvemonth or thereabouts of that period the profits were decidedly scant. In the revival of 1909 there were several months in which production was heavy without profits being at all satisfactory. The next revival produced two years, 1912 and 1913, of equal tonnage output, 1912 showing some idleness in its fore part and 1913 some in its latter part, but the profits of 1913 were decidedly larger than the profits of 1912.

The tonnage was the same, and the percentage of operation to capacity was lower in 1913 than in 1912, for capacity was increasing almost continuously in the two years.

Citing steel trade history in this manner is another way of saying that throughout a period of activity buyers do not get their steel at the low prices that obtained during the previous inactivity. They pay higher prices and are willing to do so. Price advances are accepted as a matter of course. But for buyers to accept steel price advances as gracefully as they did before the war, at least one pre-war condition must prevail, that of sellers being conservative and cautious in increasing their asking prices. Except for the boom of 1899, which occurred before the steel industry had acquired steady habits, individual price advances were very moderate, until the war came to upset things. For steel buyers to have the same confidence in prices they exhibited at various times before the war sellers should follow the pre-war custom of being conservative.

### India's Future in Steel

In the testimony he gave nine years ago this month in the Government's suit against the Steel Corporation, President James A. Farrell referred to India as one of the foreign countries which could send pig iron to the United States and undersell American manufacturers. At the time he testified a shipload of pig iron was on its way from Calcutta to San Francisco, the first pig iron coming from India to the United States. The cost of this pig iron at the furnace in India was put at \$5.40 a ton; the freight rate to Calcutta was 48c. By sailing vessels the rate from Calcutta to San Francisco was from \$5 to \$6.50 per ton. Thus the cost of Indian pig iron at that time, plus the rate to San Francisco was but little more than the freight of \$10.08 per ton then existing on pig iron from Birmingham, Ala., to San Francisco.

Mr. Farrell's testimony is recalled in view of an article which has just appeared in the London *Iron-monger*, saying that India will be in a position to produce the cheapest steel in the world. The article predicts important extensions in iron and steel making in British India, referring to four companies which plan to produce a "wide range of raw material and finished iron and steel, including electric steel." It is added that at one of these new works the blast furnaces are finished and another has completed the purchase of steel-melting, rolling, forging and foundry plant. The chief desideratum in iron and steel manufacture—close proximity of coke and ore, limestone, blast furnaces and steel works—is met to a marked degree in one of the new undertakings. India is one of the largest buyers of British iron and steel, and the London paper suggests that these new enterprises may result in "a serious diminution in British export trade."

India has been and is an importer of steel on a large scale, chiefly from Great Britain. In 1913 the combined British and American iron and steel exports to India averaged 69,000 gross tons per month. In 1919 they were 32,500 tons a month. There was an advance to 60,200 tons per month in 1920 and a decline to 42,900 tons per month last year. British manufacturers contributed 96.8 per

cent of the total from the two countries in 1913 and last year 83.9 per cent.

A writer in the *London Iron and Coal Trades Review*, in saying that in the last 10 years India has been coming forward as a rival to the United States in low cost of producing iron and steel, ventures the opinion that eventually she may challenge all other countries except the United States in the matter of output. It should be easily possible for the steel works of India, in the next few years, to reach a position where they could supply all the needs of that country. The probabilities are that not only will this come to pass, but that India will become a competitor of Great Britain and the United States for iron and steel business in non-producing countries.

### Saturation in House Building

The quickness with which a glut in merchant shipping was reached after the war suggests the possibility that the peak in dwelling house construction may soon be passed. How often have the real estate columns of the daily newspaper made the prediction that there is "going to be a building boom," that being no doubt the common talk in real estate circles.

The statistics of building permits and building construction, of which there is now a very fair array, indicate, however, that we are already in the midst of great activity in residential construction. There is also the evidence of busy factories making building materials of all sorts. These factories could not and do not expect to operate at capacity or near capacity year after year. There is necessarily sufficient capacity to take care of fairly high points in demand for the product, and 100 per cent or 90 per cent continuous activity cannot be expected. The steel trade itself has furnished testimony to the country's activity in residential construction, for in nails, sheets and tubular products it is possible to an extent to identify business that is predicated upon dwelling house construction, and the orders of this character have been decidedly good for months past.

In more than one way much harm was done by the talk in 1920 of an immense "housing shortage" in the United States. Labor, asked to accept lower and reasonable wages because the demand was great, was encouraged to hold out for high rates, and very largely has succeeded. Landlords were encouraged to demand high rents rather than to erect additional houses. A part of the momentary scarcity of housing was due to a temporary inflation in demand. Many men were trying to live in houses and apartments far beyond their means. Their incomes were temporarily swelled, not permanently increased.

Of late we have had the double trend towards equalization, in housing facilities increasing at a very substantial rate and in the demand decreasing by many households moving to smaller quarters. Probably no small factor in the readjustment has been the return home of many men who on migrating in search of work required fresh space, but left vacant space behind. As these workers return home the excess demand they created disappears.

In this talk in the past two or three years of

a great necessity for much more "home building," too much reliance has been placed on the theory of a "higher standard of living." The desire and the ability to realize it are entirely different things. The total income of the country, measured in goods and service, is only so much. It cannot be increased by desires, only by harder or more efficient work. That is as to the total income; but further it does not appear that the average individual is disposed to spend a larger percentage of income than formerly upon housing. Rather the tendency is likely to be in the other direction. There are more amusements that take the average dweller from home and at the same time require money.

While the peak in dwelling house construction may soon be passed, there is no likelihood of stagnation. There remains a wider margin by which costs can come down than is commonly realized. Comparisons are made to show that present-day costs are "not so bad" when set against pre-war costs, and the point should be picked out that in certain respects construction is more economical than before the war. Some of the methods are much more efficient, tending partly to offset the extremely high cost of labor. Liquidation in labor, inevitable in time, will make a greater hole in building costs than is now commonly recognized and some of the needed stimulus to building will then be given.

### Market Prices and Cost Factors

It was pointed out by Congressmen Anderson of Minnesota, the speaker at a recent conference in New York of editors of business papers, that advances or declines in market prices of commodities occur without any particular change in the relation between the various cost factors. The percentage of each item in the ultimate cost was found almost constant over a long period of years, over a wide range of prices, and over a considerable number of items, when analyzed by the Joint Commission of Agricultural Inquiry established by Congress.

Further evidence is afforded by figures of the 1919 manufacturing census for the United States. The value added by the manufacturing process, being the total value of products less the value of materials used, is given as something more than twenty-five billions of dollars. Wage payments for the same year are given as a little more than ten and one-half billions of dollars. Wages thus form 42.1 per cent of the total value added by manufacturing.

Making a similar comparison for the census of 1914, we find that the percentage is 41.3. In the census of 1909 wages constituted 40.2 per cent of the total value added by manufacturing; in 1904 the figure was 41.7; in 1899 it was 41.6 per cent. It will be seen that in these five census years, spread over two decades, the highest figure is less than 2 points greater than the lowest. In 1899, 1909 and 1919 prices were advancing sharply; in 1904 and 1914 they were virtually stationary; but the percentages absorbed by labor remained almost constant.

An interesting fact in this connection lies in the relation between wages and salaries. The above figures are wages alone. But each census for a number of years has shown a greater percentage

increase in total salaries than in total wages, with the exception of the 1919 census. In this latter case, wages showed a much higher percentage of increase (since 1914) than did salaries. This reflects the high wages in war industries and the comparatively stationary position of the man depending upon an annual salary.

The conclusion to which the Joint Commission of Agricultural Inquiry directs attention, as to the approximate uniformity in the relations of cost factors to each other, is presumably based on yearly averages and does not preclude temporary variations. Public attention has been focused sharply for some time on glaring cases of high distribution costs. Prices of farm products have been abnormally and disastrously low, whereas transportation costs have been at the highest point in many years. Thus the disparity between what the Iowa or Nebraska farmer received for a certain quantity of food and what was collected by the hotel keeper at Chicago for a like quantity has pointed many an argument for freight reductions. In the past 18 months many inequalities have appeared in the rate of readjustment from war prices, in various lines of trade and industry, due to the fact that some readjustments began earlier than others and some carried prices much nearer to the pre-war level than others.

## CORRESPONDENCE

### Keeping Delivery Promises as a Factor in Export Trade

*To the Editor:* I have followed the various items in THE IRON AGE which dealt with South American trade with interest. Apparently most of the writers of these articles consider credits as the most important feature in getting this trade; in this I differ from them.

Our location here, which is remote from most of the centers of machine manufacture, places us in very nearly the same relation to them as their prospective customers located in South America. We do not find that credit is of anything like as much importance as ordinary honesty. Banking facilities are ample for handling matters of credit, and credit is properly a function of the bank and not of the manufacturer.

A few months ago there were good prospects for business in Mexico, and as we are so located as to be able to load brick direct from the kiln to schooners, we were particularly interested in it. The small disturbance in the oil field put a stop to this before actual orders were obtained, but in the negotiations which took place with both Cuban and Mexican merchants, there were plenty of them who were able to offer cash terms.

We should judge, however, that if South American buyers of machinery have had experiences similar to ours, they had very good reason for not buying from American manufacturers. In December, 1919, we contracted with the XXX Co. for a machine for February delivery. About the time the machine should have been shipped, they started to find fault with our credit. We gave them as much assurance on this point as they asked for, and would have found it no inconvenience to have made a deposit with the bank to be paid on delivery of shipping papers and inspection. However, they failed to make delivery and claimed labor troubles. Delivery was postponed for one reason or another until May, when they told us that they could not promise certain delivery even by August or September, but offered a machine larger than the one which we had ordered, or one smaller, at a price advance of practically 50 per cent over the price at which these machines were offered at the time when we contracted with them.

Many manufacturers have no way of getting in touch with prospective customers located at remote points except through their advertisements in trade papers. We wonder how many of the shipments which were turned down in South American ports were contracted for before the 1920 boom, and shipped six months or a year after the contracted time of delivery, and likewise after the slump in prices.

We suggest that, as a practical step toward getting South American trade, trade papers carefully eliminate all advertisements of unreliable, irresponsible and generally dishonest firms, and that customers who are introduced to manufacturers through advertisements in trade papers be given assurance that irregularities on the part of advertisers will be promptly and thoroughly investigated.

Theoretically the courts offer a remedy for such matters, but I would like to know what practical good any one could see in court action for enforcing a claim of a buyer located in South America, or even here, against a seller located in Pennsylvania. D. KIRK,

Secretary-Treasurer Kirk Brick & Lumber Co.  
Bucks, Ala., May 3.

### Employers' Rights in Employees' Inventions

*To the Editor:* In the issue of THE IRON AGE for March 16, 1916, appeared an article on page 667 by George Hillard Benjamin, entitled "Ownership of Patents—Factors Determining Rights of Employers and Employees." In that article the statement is made: "Many attempts have been made to draw contracts in which an employee agrees to assign to the employer each and every invention he may make during the time of employment. Such contracts, where no consideration other than the usual salary or wages of the employee is stated, are wholly void."

I would very much like to learn when, where, and according to what law court, decisions of that kind have been rendered. Have you any such records? At the time you printed the article, had you any record or were you cited any cases by the author where such decisions had been rendered?

GEORGE E. BARSTOW,  
Consulting Engineer.

East Lynn, Mass., April 26.

*To the Editor:* In reply to the query of your correspondent, the point involved was settled in the case of the Pressed Steel Car Co. vs. Hanson, 137 Federal Reporter, 403. In this decision, the court stated, "An employer has no right to a patent for an invention made by an employee in the absence of an express contract or agreement for the specific employment to make the invention."

Also, Paul Steam Systems Co., vs. Paul, 129-Federal Reporter, 757.

Hildreath vs. Duff, et al, 143-Federal Reporter, 139.

Wright vs. Vocalion Organ Co., 148-Federal Reporter, 209.

Thompson vs. Automatic Fire Prevention Co., 197-Federal Reporter, 750.

The general principle involved is that the parties to a contract are bound by the terms of the contract. For instance, an employer agrees to pay a certain salary; an employee agrees to do a certain specified work. Should the employee make an invention subsequent to the date of the contract, and not distinctly specified and included within the terms of the contract, the contract does not extend to such invention, as the thing, i.e., the invention, was not in esse or contemplated, and therefore was not within the terms of the contract or covered by the compensation.

Further, it has been held that contracts relating to an indefinable thing not in esse, are void, not only for that reason, but as opposed to public policy.

The rule followed by many corporations in making contracts with employees is to specify so much for their services in the line of their specialty, and so much for any inventions that they may make during the time of their employment, which relate, or pertain to, or concern the business of the employer.

GEORGE HILLARD BENJAMIN,  
Consulting Engineer.

25 West Forty-third Street, New York, May 4.

## STEEL SHEET TRADE

### Interesting Period Shown in Chart Form by Association

The National Association of Sheet and Tin Plate Manufacturers is the latest among the trade associations to adopt the suggestion of Secretary of Commerce Hoover to make public its sales, production and other statistical data which, until about a year ago, were available only to its membership. For about a year the Department of Commerce has been provided with statistics of the activities of the association.

The statistical information is prepared in chart form and goes back to the beginning of 1919 and comes down to May 1 this year. The chart, which is presented herewith, covers probably the most interesting period in the history of the steel sheet trade, and while it does not embrace all of the manufacturers of the country, since the activities of the American Sheet & Tin Plate Co. and of about 6.7 per cent of the independent capacity of the country are not included, it presents a typical picture of the industry over almost three and one-half years. Allowing the American Sheet & Tin Plate Co. about one-third of the country's sheet and jobbing mill capacity and deducting the capacity of the independent companies not members of or reporting to the association, the figures represent about 60 per cent of the country's capacity. The totals against which these percentages are shown are on 436 hot mills having a monthly capacity of 244,500 net tons, representing 93.3 per cent of the potential production of the country, exclusive of that of the American Sheet & Tin Plate Co.

At the end of April, unfilled orders were 160 per cent of monthly capacity. This is the highest point noted previously since the end of November, 1920, and at that time such obligations were on a rapidly declining scale, and kept on declining, with only two short-lived interruptions, in May and October, 1921, until January of this year. In the middle of that month, when unfilled tonnages began to rise, such obligations were only 62½ per cent of capacity. The rally from this point is plotted as almost perpendicular, beginning with March. The peak point of unfilled tonnages reached in January, 1920, showed them to be almost 375 per cent of capacity.

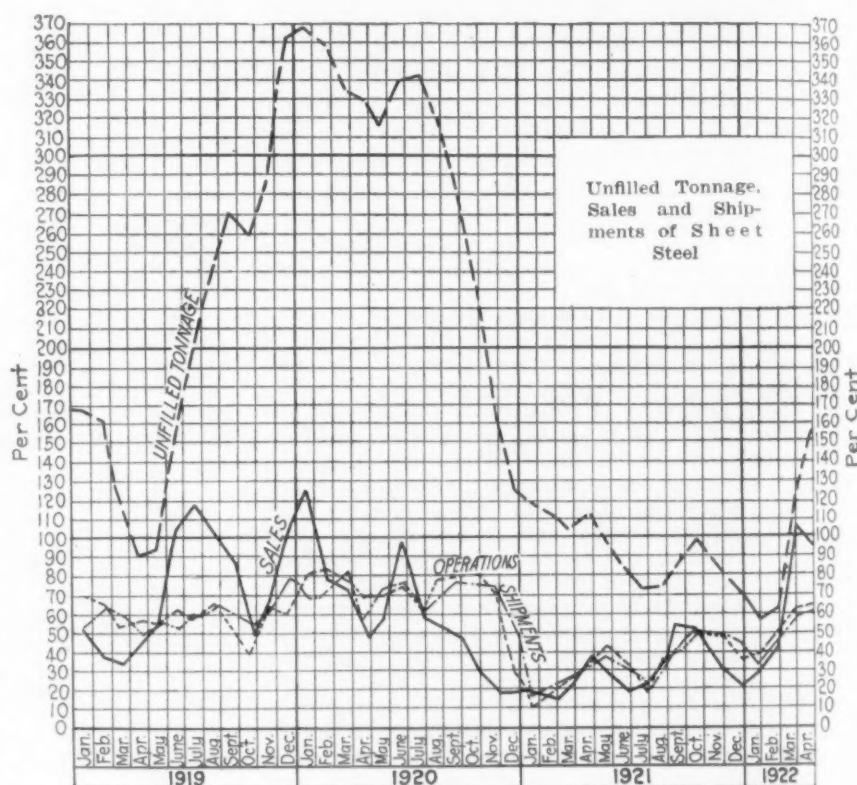
Sales reported in April declined about 10 per cent as compared with March. In the latter month, sales were 110 per cent of capacity, while April sales were just about capacity. Sales have been on the rise since the first of the year, the most recent low point being reached last December, when they were only 20 per cent. The most recent peak point, reached in January, 1920, was 130 per cent. This was followed by a dip to about 53 per cent in April, that year, with a recovery to 103 per cent in June that year. From that month until January this year, the sales have been as low as 20 per cent, this coming in February, 1921, and as high as 58 per cent, reached in the flurry of buying in September and October last year.

Fluctuations in operations and shipments are much less marked than those in sales and unfilled tonnages. The highest operation point reached was in March, 1920, just prior to the railroad strike, when about 83 per cent of the capacity embraced by the association was engaged. The lowest point was in January, 1921, when only about 20 per cent of the capacity was occu-

pied. On April 30, active operation was 75 per cent of the whole. Shipments in April were 70 per cent of monthly capacity as compared with only 10 per cent in January, 1921, the low point, and 85 per cent, the high point, reached in March, 1920.

### Sale by Shipping Board

WASHINGTON, May 9.—The United States Shipping Board Emergency Fleet Corporation will sell at auction Monday, May 15, beginning at 10 a. m., the surplus material located at Wilson Point, South Norwalk, Conn. The most valuable offerings include triple expansion marine engines of 700 and 850 horsepower, 293 pumps, 46 boilers of 250 marine horsepower, 43 condensers of 2000 sq. ft. each, 177 winches, single drum, double and single winch heads, double cylinder, 4 automatic towing engines, 13 x 13, nearly 200,000 ft. of anchor chain of American and English make, some with connecting and anchor shackles. There will also be included in the sale hand and hydraulic tools, blowers, chemical tanks, steering engines, motors, generators, steam separators, metal and wood working machinery,



power plant with two locomotive-type boilers and one standard water tube, etc.

### Steel Industry in Chile

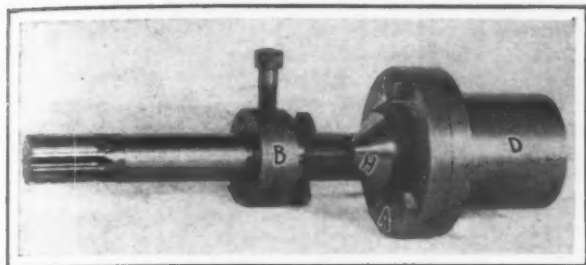
The development of the steel industry in Chile, which began many years ago with the blast furnace at Corral, has been greatly hampered by the world-wide depression. Nevertheless, the Compania Chilena Electro-Metalurgica is enlarging its plant, which now has a capacity of 2000 tons of steel a year, says the *London Iron and Coal Trades Review*. This company sells all the steel produced to the state railroad. The government has recently cancelled a contract awarded to an Italian firm for the supply of armament valued at 11,000,000 lire (£440,000 at par).

Returns from the principal clearing houses of the United States for April show a total of more than thirty-three billions of dollars. This is the largest month since January, 1921. It is the largest April, with the exception of 1920, in the history of the country. The increase over April of last year is 14.8 per cent. The present figure is more than double the highest figure preceding the great war.

### Non-Floating Reamer Holder

The Casler reamer holder illustrated is a recent addition to the line of the Marvin & Casler Co., Canastota, N. Y., and was designed on the theory that in order to ream a straight, true hole, it is necessary to hold the rear end of the reamer in line with the center line of the spindle and hole which is to be reamed. It is intended to offer a quick method of keeping the reamers properly lined with the spindle at all times.

The illustration shows the holder complete, and fitted to a sleeve or adapter *D* for use in a Jones & Lamson turret lathe. The parts as lettered are: *A*, the face plate, which is of machine steel, hardened and ground; *B*, the reamer holding collar, also of machine steel, hardened and ground; *D*, bushing or adapter of cast iron for mounting reamer holder on Jones & Lam-



Non-Floating Reamer Holder. The adapter with centering plug is shown at right

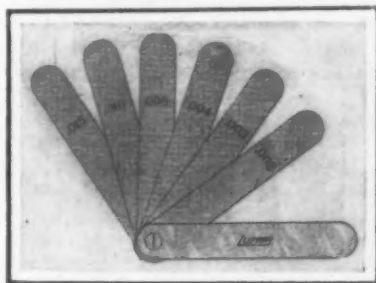
son turret lathe and fits the tool holder on the turret; and *H*, a cone-shaped centering plug of machine steel hardened and ground. The face plate (*A*) is held by three cap screws which are threaded in the adapter sleeve (*D*). The holes in the face plate for the cap screws are oversize, which allows the face plate to float over the face of the adapter sleeve.

In lining up the holder with a piece to be reamed the latter is first bored to any convenient size to receive the cone-shaped centering plug. The piece is then faced a short distance from the hole and square-corner chamfered slightly, to present a surface against which the cone-shaped centering plug can be brought. The turret is then brought toward the work, and when the centering plug seats in the bored hole it will bring the face plate (*A*) concentric with the spindle of the lathe. While held in this position the three cap screws are tightened, after which the turret is backed away and the reamer-holder sleeve *B*, carrying the reamer, substituted for the centering plug. The set up is then complete, ready for production.

The reamer holder fitted with sleeve to enter the turret of Jones & Lamson machines are available, and special fittings necessary to attach the device to other makes of turret lathes can be furnished. The face plates, reamer-holder sleeves and centering plugs are interchangeable. Only one centering plug is needed for any group of machines and the reamer holding sleeves can be ordered in sizes and as required.

### Improved Thickness Gages

Improved thickness gages, the outstanding feature of which is a patented lock by means of which any leaf



A Patented Lock Permits Leaves to Be Held Firmly in Any Position

may be held firmly in any position, have been placed on the market by the Lufkin Rule Co., Saginaw, Mich.

The lock feature is convenient in making adjustments of tappets on motors, the holding of the leaf by

means of the lock nut permitting the use of the gage in its full length of 5½ in. On V-type motors, where work is performed on an angle, the gages are particularly useful.

The No. 06 gage has six leaves ranging from 0.002 to 0.015 in. thick, and the No. 07 is the same with the addition of an 0.0015 in. leaf. No. 09 has nine leaves. On these three gages the 0.015 leaf and name plate form the case to protect the other leaves. Another size, the No. 109, has the same leaves as the No. 09 gage, but is provided with a case into which all the leaves fold. On all, the blades are ¾ in. wide by 3 in. long. Two or more leaves separated from the others and locked convert the tool into a limit gage. The thickness of the leaves is clearly marked on the side.

### Building Permits Near a Record

Shortage of housing accommodations, particularly in the large cities, is being rapidly relieved. Figures of the United States Bureau of Labor Statistics relating to 140 cities show that the number of building permits issued in 1921, as compared with 1920, indicates an increase of 71 per cent in one-family dwellings, 211 per cent in two-family dwellings, 290 per cent in dwellings with stores combined, 201 per cent in apartment and tenement houses. The average cost of one-family dwellings as indicated in 135 cities, was \$4,314 in 1920, and \$3,925 in 1921.

Families provided for in 1920 in ten of the large cities, including New York, Chicago, Detroit and Cleveland, aggregated 42,342, as compared with 106,393 in 1921. New York alone accounted for 51,360 families in 1921, or nearly one-half of the total. This figure is greater than the total for the ten cities in 1920. A total of 26 cities more than trebled their family housing permits in 1921, as compared with 1920.

### Increases Range of Micrometer Caliper

The range of the No. 55 micrometer caliper of the Brown & Sharpe Mfg. Co., Providence, has been changed to take measurements from 2 to 6 in. This



Micrometer Caliper with Range of from 2 to 6 In., Obtained by Means of Four Anvils Conveniently Changed

range is obtained by means of four anvils which are arranged for quick and convenient changing and are held positively in place by a knurled nut. One anvil is for measurements from 2 to 3 in.; another from 3 to 4 in., and so on.

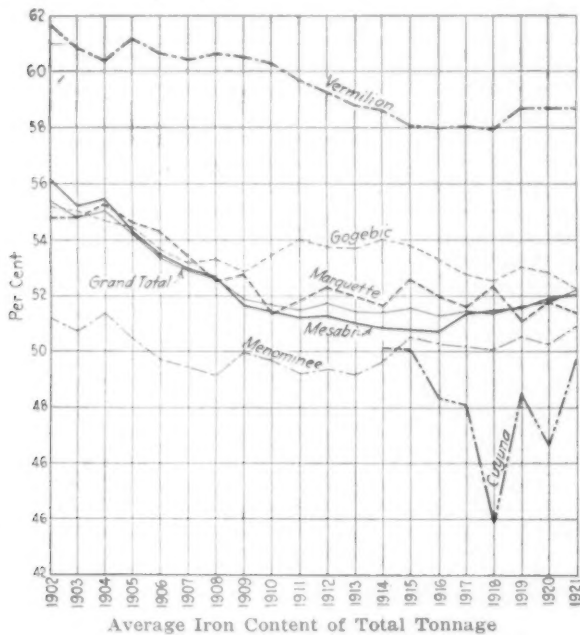
The new tool is intended especially for garages and service stations where small pistons, many under 3 in. in diameter, and also the large pistons of trucks and tractors, require accurate measurement. It is intended to measure the same range of work as a more expensive set of three or four micrometers. The accompanying illustration shows the micrometer in use measuring a small piston.

Damage estimated at \$250,000 was done by a fire at the Southside Works, Jones & Laughlin Steel Co., Pittsburgh, early on the morning of May 3. Buildings located on Carson Street, between Twenty-seventh and Twenty-eighth streets, including a machine shop, roll shop and polishing plant, were heavily damaged and the machine shop completely destroyed. Much machinery will have to be replaced.

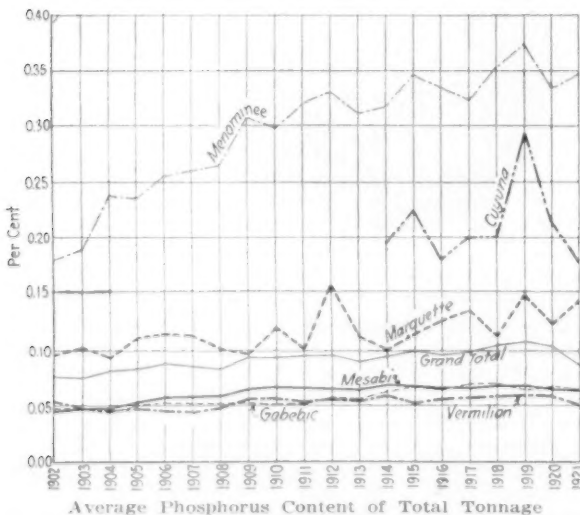
## LAKE SUPERIOR ORES

## Analyses Showing Content for Every Year from 1902 to 1921

The Lake Superior Iron Ore Association, Kirby Building, Cleveland, of which W. L. Tinker is secretary, has compiled an elaborate report showing average analyses of Lake Superior iron ores with graphic charts from 1902 to 1921 inclusive. The tables give the analyses of Bessemer and non-Bessemer ores from all the ranges, showing iron natural, phosphorus, silica, manganese and moisture. The report indicates that for the most part, the Lake Superior ores are main-



taining the standards of earlier years without much change. For example, the average iron content of all the old range Bessemer ores in 1902 was 58.03 per cent, while in 1921 it was 54.61 per cent, not a very serious decline. The average phosphorus content has continued remarkably uniform, in 1921 it was 0.041, exactly the same as in 1902, and there was very little variation throughout the period, the lowest analysis being 0.039



and the highest 0.043. On the Mesabi, the average iron content in 1921 was 54.25 and in 1902 it was 56.67, while the phosphorus content was 0.040 in 1921 and 0.039 in 1902.

The average analyses of all low phosphorus non-Bessemer ores show an iron content in 1902 of 54.70 per cent, compared with 51.23 per cent in 1921. The average phosphorus content was 0.075 in 1921 and 0.082 in 1902. The average iron content of the high phosphorus non-Bessemer ores shows remarkably small change in the iron content; for example, on the old

## Average Analyses of Total Tonnage, All Grades Lake Superior Iron Ores

Gogebic Range					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921.....	52.10	0.061	1911.....	54.00	0.051
1920.....	52.75	0.066	1910.....	53.39	0.050
1919.....	52.95	0.063	1909.....	52.83	0.052
1918.....	52.52	0.069	1908.....	53.23	0.052
1917.....	52.75	0.068	1907.....	53.14	0.050
1916.....	53.21	0.064	1906.....	53.57	0.051
1915.....	53.74	0.066	1905.....	54.43	0.049
1914.....	54.00	0.061	1904.....	54.66	0.045
1913.....	53.66	0.053	1903.....	55.02	0.048
1912.....	53.74	0.056	1902.....	55.12	0.048

Marquette Range					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921.....	50.95	0.138	1911.....	51.82	0.102
1920.....	51.70	0.122	1910.....	51.36	0.121
1919.....	51.06	0.148	1909.....	52.68	0.098
1918.....	52.31	0.112	1908.....	52.53	0.101
1917.....	51.56	0.132	1907.....	53.39	0.113
1916.....	51.90	0.125	1906.....	54.27	0.115
1915.....	52.57	0.113	1905.....	54.59	0.110
1914.....	51.60	0.102	1904.....	55.21	0.093
1913.....	51.94	0.111	1903.....	54.83	0.102
1912.....	52.20	0.154	1902.....	54.84	0.097

Menominee Range					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921.....	50.82	0.347	1911.....	49.25	0.321
1920.....	50.20	0.332	1910.....	49.85	0.298
1919.....	50.52	0.375	1909.....	49.90	0.308
1918.....	50.02	0.353	1908.....	49.14	0.263
1917.....	50.16	0.324	1907.....	49.46	0.259
1916.....	50.26	0.333	1906.....	49.68	0.254
1915.....	50.52	0.348	1905.....	50.46	0.236
1914.....	49.61	0.319	1904.....	51.21	0.239
1913.....	49.14	0.311	1903.....	50.72	0.189
1912.....	49.34	0.330	1902.....	51.11	0.179

Vermilion Range					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921.....	58.60	0.049	1911.....	59.59	0.051
1920.....	58.62	0.057	1910.....	60.14	0.054
1919.....	58.60	0.059	1909.....	60.49	0.053
1918.....	57.90	0.057	1908.....	60.57	0.048
1917.....	58.02	0.055	1907.....	60.42	0.043
1916.....	57.95	0.054	1906.....	60.60	0.044
1915.....	58.02	0.051	1905.....	61.14	0.047
1914.....	58.56	0.058	1904.....	60.37	0.045
1913.....	58.77	0.052	1903.....	60.86	0.048
1912.....	59.18	0.054	1902.....	61.65	0.052

Cuyuna Range					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921	49.66	0.175	1917	48.06	0.199
1920	46.61	0.211	1916	48.31	0.179
1919	48.35	0.292	1915	50.06	0.224
1918	43.87	0.200	1914	50.09	0.193

Total Old Range					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921	52.28	0.153	1911	52.23	0.166
1920	51.45	0.169	1910	52.22	0.147
1919	51.73	0.191	1909	52.36	0.155
1918	51.10	0.172	1908	52.44	0.132
1917	51.68	0.164	1907	52.82	0.138
1916	52.22	0.156	1906	53.28	0.139
1915	52.79	0.164	1905	54.01	0.126
1914	52.40	0.151	1904	55.45	0.122
1913	52.28	0.152	1903	54.45	0.108
1912	52.72	0.161	1902	54.74	0.104

Mesabi Range					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921	51.98	0.061	1911	51.12	0.063
1920	51.84	0.063	1910	51.42	0.065
1919	51.50	0.066	1909	51.59	0.062
1918	51.39	0.066	1908	52.66	0.059
1917	51.25	0.065	1907	52.95	0.058
1916	50.64	0.065	1906	53.44	0.057
1915	50.74	0.066	1905	54.24	0.051
1914	50.81	0.067	1904	55.45	0.047
1913	50.97	0.063	1903	55.19	0.047
1912	51.20	0.064	1902	56.07	0.045

Grand Total					
Year	Aver. Iron (Nat.)	Aver. Phos.	Year	Aver. Iron (Nat.)	Aver. Phos.
1921.....	52.07	0.087	1911.....	51.47	0.095
1920.....	51.69	0.103	1910.....	51.68	0.092
1919.....	51.57	0.108	1909.....	51.85	0.093
1918.....	51.29	0.104	1908.....	52.58	0.083
1917.....	51.40	0.099	1907.....	52.91	0.086
1916.....	51.20	0.097	1906.....	53.38	0.088
1915.....	51.49	0.100	1905.....	54.14	0.082
1914.....	51.34	0.095	1904.....	55.02	0.080
1913.....	51.37	0.090	1903.....	54.84	0.075
1912.....	51.69	0.096	1902.....	55.39	0.075

range, the average iron content in 1902 was 51.81, and in 1921 it was 51.07.

The average natural iron content of ore shipped from the Mesabi district has shown an increase every year for the past six years, after steadily declining

for 15 years and is now over 1 per cent greater than in 1916. With the mining of leaner ores a reduction in the average iron content might be expected. Apparently the only explanation found for the increase is in the fact that the practice of washing ores has become more general during the past few years. However, figures cannot be compiled to show how much ore is now being subjected to the washing process, as separate reports are not made of tonnages of washed and unwashed ore.

With the greater amount of ore shipped from the Mesabi than from the Old Range mines, the increase in iron content of Mesabi ore naturally has had an appreciable effect on the percentage of iron content of ore shipments from the entire Lake Superior district. The average iron content of all ore shipped from the Lake Superior district during 1921 was 52.07 per cent, being higher than during any previous year since 1908. The nearest approach to that percentage in a 13-year period was in 1909, when the average content from all districts was 51.85 per cent. As the ore movement last year was the lightest in many years, it is safe to assume that production was more generally confined to the better grades of ore and consequently the average of 52.07 per cent for last year may not be maintained. During the previous year, 1920, when the ore movement was very heavy, the average iron content of shipments from all districts was 51.69 per cent.

Old Range figures indicate that the average iron content was increased in the Old Ranges last year by the mining of the better grades of ores. The total average iron content of ores shipped from Old Range mines during 1921 was 52.28 per cent as compared with 51.45 per cent in 1920, the average being higher than since 1915, when it was 52.79 per cent. However, ore shipped last year from both the Gogebic and the Marquette Ranges showed a lower average iron content than in any year since 1902. The average the Gogebic Range was 52.10 per cent as compared with 52.75 per cent in 1920 and the average of the Marquette Range was 50.95 per cent as compared with 51.70 per cent in 1920. The Menominee Range showed an increase from 50.20 per cent in 1920 to 50.82 per cent in 1921, being the highest since 1904. The average content of iron from the Vermillion Range has showed little change for several years, being 58.60 per cent in 1921 as compared with 58.62 per cent in 1920. The Cuyuna Range ore showed a marked increase in iron content last year, being 49.66 per cent as compared with 46.61 per cent during the previous year. This increase was due to the fact that comparatively little manganiferous ore was shipped from this range last year.

### Boiler Makers to Meet in June

The annual convention of the American Boiler Manufacturers' Association will be held on June 5, 6 and 7 at Buckwood Inn., Shawnee on Delaware, Pa. In addition to routine business and reports of standing committees there will be on June 5 the president's annual address. A paper will be presented by E. C. Fisher, Wickes Boiler Co., Saginaw, Mich., on "A Study of Thickness of Shell Plates in Return Tubular Boilers." A report will be presented by Charles E. Gorton, chairman of the American Uniform Boiler Law Society. R. Sanford Riley, president Sanford Riley Stoker Co., will talk, with moving pictures, on "A Close-up of the Riley Underfed Stoker."

On June 6 an address will be made by M. W. Alexander, managing director the National Industrial Conference Board. L. E. Connelly, D. Connelly Boiler Co., Cleveland, will present a report on "Proper Setting Heights of Return Tubular Boilers." R. B. Dickson, Kewanee Boiler Co., Kewanee, Ill., will report on "Steel Heating Boilers." The banquet will be held this evening.

On June 7 an address will be made by Dr. Charles Aubrey Eaton of the American Educational Association, and a report made by the committee on "Rules for Inspection of Materials and Boilers."

## A COAL STORAGE INQUIRY

### Bureau of Mines Seeks Co-operation of Manufacturers in Getting Data

The Bureau of Mines at Washington, in conjunction with the Department of Commerce, is investigating the possibilities of coal storage with a view to giving more regular mining and movement of coal. The bureau requests that manufacturing users of coal give it their views and conclusions in connection with data on the various items indicated below:

#### Method of storage:

- Under water or not.
- Closed sheds or in the open.
- Kind of floor or ground.

Location of storage with reference to point where coal is to be used.

Quantity stored—maximum, average.

Spontaneous combustion, methods of preventing.

Handling fires, method of.

Devices used for observing temperature and inspection.

Danger point as regards temperature.

Deterioration in sizes and also in heating value in stored coal.

In your practice what tonnage can be stored per acre of available space?

Depth of pile, maximum allowed.

Kinds of coal stored.

District or trade name.

Size stored.

Is coal screened before storing?

How long coal must be stored.

Best time of year to store.

Cost of storage plant and cost of maintenance.

Cost of handling in and out of storage:

Transportation to pile.

Transportation from pile to point of use.

Effect of climate on stored coal, if any.

Costs of unloading and releasing.

Method of handling in and out of storage.

Cost of investment and fixed charges.

Readers of THE IRON AGE who comply with this request for information on the above points are asked to send their communications to F. R. Wadleigh, commercial engineer, Bureau of Mines, Washington, D. C. Mr. Wadleigh is chief of the coal and coke section, fuel division, Department of Commerce.

### Characteristic Move by Senator La Follette

WASHINGTON, May 9.—The resolution introduced yesterday by Senator La Follette of Wisconsin regarding the proposed merger of independent steel companies is looked upon as a typical effort of that Senator to hamper business organizations and to institute a prolonged and useless investigation. The resolution, which has been laid on the table subject to the call of La Follette, who is expected to speak on the subject in the near future, pretends that if the proposed merger were brought about, it, together with the Steel Corporation, would develop a complete monopoly of the steel industry. The resolution asks the Attorney General and the Federal Trade Commission to inform the Senate as soon as possible what steps they have taken, or propose to take, to ascertain the purposes and probable effects of the proposed merger, and what have been the results of any investigations which they may have conducted. It is undoubtedly known to Senator La Follette that neither the commission nor the Department of Justice has made any investigation as to the merger. The resolution further asked the Attorney General to inform the Senate whether he considers it advisable to proceed under the appropriate provisions of the Sherman law and Clayton law "to prevent and restrain this impending combination."

The following officers were elected at the annual meeting of the Sheet Metal Contractors' Association of Missouri held here last week: President, H. W. Symonds, St. Louis; vice-president, L. H. Dorn, Joplin; secretary, Otto E. Scheske, St. Louis; treasurer, Frank K. Higgins, St. Louis.

## MECHANICAL ENGINEERS MEET

### Regional Meetings Will Be Regular Feature — Code of Ethics to be Voted Upon

ATLANTA, GA., May 9.—The American Society of Mechanical Engineers at its meeting here to-day decided to make regional meetings such as that held some weeks ago at Tulsa, Okla., a regular feature under headquarters supervision. This means more than two society meetings a year and that the committee on meetings and papers will allocate leading papers to such meetings. The regular spring meeting of 1923 will be held in Montreal.

A simple code of ethics for engineers drawn up by representatives of mechanical, mining, electrical, civil and heating engineers will be sent to the membership for a letter ballot. The proposed new constitution was modified to leave offices as they are to-day with six vice-presidents and nine managers.

L. W. Wallace, secretary American Engineering Council at Washington, was asked to interview Secretary of Commerce Hoover to determine the feasibility of a special wave length for broadcasting technical information as for use in radio transmission to engineering meetings.

#### Field for Improvement

There is a vast field for research and improvement in the iron and steel industry, F. L. Leach of New York declared at the meeting to-day. Progress, he said, was the task of engineers. Summarizing the problem of material handling in iron and steel, Mr. Leach said:

"It is apparent that there are many gaps in handling material from the ore mines to the finished steel which can be improved even with the present methods of manufacturing. Notable among these are the methods of conveying raw materials to the open-hearth furnace, and the many steps required from the blast furnace to the finished steel ingot.

"They include the rehandling of material several times to obtain the desired refinement of steel, which is especially important where most of the material is handled in a molten condition with its consequent high cost. This refining process will change materially in the next few years through the medium of electricity, and as central power plants become more highly developed and more of our natural resources are put into use to obtain cheap electrical power, furnaces will be developed that will operate by a continuous process.

"The iron and steel industry probably requires a greater diversity of material-handling equipment than any other type of manufacturing, because of the enormous bulk and weight to be handled. From the time the material leaves the mines until it is turned out of the mills as finished product it is constantly being moved by heavy conveying machinery of all descriptions.

"Nearly every known type of power has been adapted to material-handling machinery about a steel plant. Steam and hydraulic power have been used extensively, but are both being gradually replaced by electricity."

Mr. Leach asserted that at the present time ore handling on the Great Lakes is carried on by a fleet of vessels unequaled anywhere in the world. Ore-loading equipment, he said, has probably been developed to the highest point of efficiency at the ports on the Great Lakes. He cited Ashtabula Harbor on Lake Erie as an example. Mr. Leach pointed out many weaknesses in present-day practices in the handling machinery and apparatus used in the manufacture of steel.

#### Stove Founders' Officers and Committees

Officers for the ensuing year were elected and routine business transacted at the yearly New York conference of the Stove Founders' National Defense Association held at the Hotel Astor May 8 and 9. Present agreements with the union molders seem likely to be adhered to, the piece work basis remaining in effect. Officers and district committees are as follows:

President, George Mitchell; first vice-president, Jo-

seph L. Anthony; second vice-president, Lewis Moore; treasurer, William A. Dwyer; secretary, Robert W. Sloan.

General executive committee, as above *ex-officio* and in addition, Richard E. Warner, D. Rait Richardson, James Mitchell, Lee W. Van Cleave, W. T. Barbour.

*First district:* J. L. Anthony, Taunton, Mass.; A. W. Walker, Boston; R. E. Warner, Taunton, Mass.; J. P. Barstow, Providence, R. I.; Franklyn Lawrence, Portland, Me.

*Second district:* J. S. Lansing, Scranton, Pa.; E. F. Hill, Peekskill, N. Y.; F. N. Brayer, Rochester, N. Y.; Paul Brooke, Royersford, Pa.; W. M. James, Richmond, Va.

*Third district:* George H. Barbour, Detroit; James M. Dwyer, Detroit; W. T. Barbour, Detroit; David F. Kahn, Hamilton, Ohio; H. K. Karges, Evansville, Ind.

*Fourth District:* N. H. Burt, Leavenworth, Kan.; L. W. Van Cleave, St. Louis; Lewis Moore, Joliet, Ill.; George D. Wilkinson, Chicago; T. P. Castle, Quincy, Ill.

### Program of American Iron and Steel Institute May Meeting

The meeting of the American Iron and Steel Institute to be held at the Hotel Commodore, May 26, will be opened by an address by the president of the institute, E. H. Gary, and will close with a dinner in the evening. After the address by Judge Gary, the following papers will be read:

The Development of the Iron and Steel Industry of Australia, by David Baker, general manager, the Broken Hill Proprietary Co., Newcastle, N. S. W., Australia.

The Relation of the Doctor to the Steel Plant, by Loyal A. Shoudy, chief surgeon, Bethlehem Steel Corporation, Bethlehem, Pa.

Industrial Housing, by C. L. Wooldridge, general superintendent, Carnegie Land Co., Pittsburgh.

The General Effect of Electrification of Steel Mills Upon Their Operation, by Wilfred Sykes, assistant to operating vice-president, the Steel & Tube Co. of America, Chicago.

The Importance of the Iron Ores of the Adirondack Region, by Frank L. Nason, geologist, West Haven, Conn.

Methods of Using Fuel in Open-Hearth Furnaces, by Herbert F. Miller, Jr., assistant superintendent, Lackawanna Steel Co., Buffalo.

Gas and Air Valves for Open-Hearth Furnaces, by W. C. Bulmer, superintendent, open-hearth department, Ohio Works, Carnegie Steel Co., Youngstown.

## COMING MEETINGS

### May

**National Foreign Trade Council.** May 10 to 12. Convention Hall, Philadelphia. Secretary, O. K. Davis, 1 Hanover Square, New York.

**National Sheet Metal Contractors' Association.** May 15 to 19. Convention and exposition, Cadle Tabernacle, Indianapolis.

**National Association of Purchasing Agents.** May 15 to 20. Annual convention and exposition. Exposition Park, Rochester, N. Y. Secretary, H. R. Heydon, 19 Park Place, New York.

**American Iron, Steel & Heavy Hardware Association.** May 23 to 25. Annual meeting, Hotel Washington, Washington. Secretary, A. H. Chamberlain, Marbridge Building, New York.

**American Society for Steel Treating.** May 25 and 26. Sectional meeting, Pittsburgh. Secretary, W. H. Elsemann, 4600 Prospect Avenue, Cleveland.

**American Iron and Steel Institute.** May 26. Spring meeting, Hotel Commodore, New York. Assistant Secretary, H. H. Cook, 40 Rector St., New York.

### June

**American Association of Engineers.** June 5, 6 and 7. Annual meeting, Salt Lake City. Secretary, C. E. Drayer, 905 State Building, Chicago.

**American Boiler Manufacturers Association.** June 5, 6 and 7. Annual meeting, Buckwood Inn, Shawnee-on-Delaware, Pa. Secretary, H. N. Covell, 191 Dikeman Street, Brooklyn, N. Y.

**American Foundrymen's Association.** June 5 to 9. Annual meeting and exhibition. Rochester, N. Y. Secretary, C. E. Hoyt, 140 South Dearborn Street, Chicago.

**American Society for Testing Materials.** June 26 to 29. Annual meeting. Chalfonte-Haddon Hall, Atlantic City. Secretary, C. L. Warwick, 1315 Spruce Street, Philadelphia.

## ON INSPECTION TOUR

### Executives of Seven Independent Companies Look Over Plants

CHICAGO, May 9.—The executives of the seven independent steel companies interested in the proposed merger spent Monday and Tuesday of this week inspecting the plants of the Inland Steel Co. and the Steel & Tube Co. of America at Indiana Harbor, Ind., and South Chicago. An announcement of the expected consummation of the consolidation will probably not be made until the completion of the tour of the works of the seven companies. Tentative relative valuations

entire plants in the most presentable condition possible.

During their stay in Youngstown, the visitors were entertained at the Youngstown Country Club on several occasions. Most of them called on Joseph G. Butler, Jr., director of the Sheet & Tube and Brier Hill companies, at his home, 525 Wick Avenue. They were the guests one evening at dinner of Mr. Campbell at his home on the Logan Road, north of Youngstown.

### Wheeling Steel Corporation Activities

WHEELING, W. VA., May 8.—Operations of Wheeling Steel Corporation are on practically an 80 per cent basis, with all except one of its plants running. The

### Steel Company Officials at Youngstown



The above photograph was taken in front of the works office building of the Youngstown Sheet & Tube Co., on Poland Avenue, Youngstown, during the inspection trip, in connection with proposed merger, of executives of seven companies involved. Six of the seven interests are represented in the group.

Top row, left to right: James H. Grose, president Brier Hill Steel Co.; Thomas J. Bray, president Republic Iron & Steel Co.; George F. Alderdice, vice-president in charge of sales of the Brier Hill company; A. C. Dinkey, president Midvale Steel & Ordnance Co.; W. E. Manning, vice-president and general sales manager Youngstown Sheet & Tube Co.; G. F. Downs, president Lackawanna Steel Co., and Charles Snelling Robinson, vice-president and general manager Sheet & Tube company.

Bottom row, left to right: John A. Topping, chairman Republic Iron & Steel Co.; W. E. Corey, chairman Midvale Steel & Ordnance Co.; P. D. Block, president Inland Steel Co.; James A. Campbell, president Youngstown Sheet & Tube Co.; James B. Kennedy, chairman Brier Hill Steel Co., and Thomas L. Chadbourne, general counsel Midvale Steel & Ordnance Co., and chairman executive committee of the merger conferences.

of the stocks of the companies are said to be as follows: \$75 a share for Republic common, \$70 to \$75 for Inland, \$75 for Youngstown, \$65 for Lackawanna, \$40 for Midvale, and \$20 for Brier Hill. The valuation of Steel & Tube Co. of America stock was not included in the report.

### Three Days at Youngstown

YOUNGSTOWN, May 9.—Following inspections of properties at Buffalo and Johnstown, executives of the seven companies involved in the steel merger negotiations spent three days at Youngstown, where they looked over plants of the Youngstown Sheet & Tube Co., Republic Iron & Steel Co. and the Brier Hill Steel Co., in the order named. The party arrived Wednesday evening, May 3, and left for Chicago on May 6 to inspect the Western properties which are represented in the amalgamation negotiations.

During the course of the inspections, a number of conferences were held at Youngstown. The representatives refrained from public discussion of the consolidation. Moses Taylor, chairman Lackawanna Steel Co., Buffalo, was the only ranking official of any of the seven concerns not present.

Clayton Marsh, chairman and Clarence Marsh, vice-president of the Steel & Tube Co. of America, were in the party, although they are not in the photograph.

Other local officials of the Youngstown companies joined the party in its inspection and participated in some of the conferences. Operating departments had worked overtime in advance of the trip to put the

company is succeeding in placing, on an open shop basis, those units which up to a year ago had been operated as union shops, and it is officially stated that there is no trouble as to the fuel supply, as the company is practically self-contained in that particular and has been able to keep its mines running despite the suspensions in non-union as well as union fields.

The schedule for this week is as follows:

Wheeling Steel & Iron Co.—Benwood plant, 45 per cent; Belmont plant, 65 per cent; Top Mill, blast furnace on; Martins Ferry, furnace idle; Yorkville plant, 60 per cent.

Whitaker-Glessner Co.—Martins Ferry mills idle; Beech Bottom plant, 100 per cent; Creek mill, 65 per cent; Portsmouth plant, 80 per cent.

LaBelle Iron Works.—Steubenville plant, 85 per cent; Wheeling plant, 90 per cent.

Judge J. B. Sommerville, Wheeling, W. Va., has under consideration the decision upon an application of the Whitaker-Glessner Co. (Wheeling Steel Corporation) for an injunction against Crescent lodge, Amalgamated Association of Iron, Steel and Tin Workers of North America, restraining officers and members of the latter from interfering with the company's efforts to operate its Wheeling district plants on an open shop basis. A hearing, which was started on May 4, was continued until May 6, on the plea of the defendants that they had not had time to prepare a defense. The defendants also agreed to conform to the demands of the company made in the injunction application. Arguments were made May 6, and a decision will be made later.

# Iron and Steel Markets

## HIGH RATE OF OUTPUT

### But Coal Situation Causes Strain, With Pig Iron Advancing

#### Activity in Lake Shipbuilding — Tightening Market in Steel Products

The steel industry has gone for another week at substantially the average rate of operations established in April. It is still drawing on the coal stocked before April 1. At the same time it continues to bring large supplies from districts that are not ordinarily feeders of Central Western coke ovens.

The strain on some of the links in the chain of production has increased and as mills in certain lines are less able to promise deliveries the tendency of prices is upward, particularly in semi-finished steel.

Pig iron being directly affected by higher coke prices, has advanced sharply this week in the Pittsburgh district, basic by \$2 and Bessemer by \$3 per ton.

The Steel Corporation has not advanced its contract prices, but some of its later bookings have been without definite promise of deliveries.

Generally the rate of new buying is less than in late March and early April; but that is because most buyers are covered for several weeks ahead and most producers are heavily booked.

There is unconcealed surprise throughout the trade at the April figures for steel ingot production. These show a gain of 11 per cent over March in the daily rate, March in turn having gained 20 per cent over February. April operations were at a yearly rate of 36,000,000 tons, whereas the country's total capacity at the end of 1913 was 35,000,000 tons and the output in that year only 30,000,000 tons.

The Steel Corporation's operating rate has held up in the past week, likewise that of the principal independents. Several smaller producers have had more difficulty. The problem of increased costs, where coal is drawn from distant districts or where coke is bought at \$6 for the little available, is troubling some steel companies and is reflected in the stiffening of prices on the heavier steel products for early delivery.

Price changes at Pittsburgh are in brief these: Billets and sheet bars are \$1 per ton higher than a week ago, with the available supply so scant that higher prices appear likely. For early shipment several makers of sheets ask \$5 per ton advance. Cold rolled strips have sold at 4c., against 3.65c. as the regular market and 3.50c. as the basis of running contracts. On steel bars 1.60c. is now common for specified delivery.

Sheet rolling mills are not getting full output in view of a scarcity in sheet bars. However, the American Sheet & Tin Plate Co. is scheduled for nearly 90 per cent operation this week.

The leading feature of the finished steel market at Cleveland is the unexpected activity in lake shipbuilding. A 610-ft. freighter has just been placed

at Toledo, calling for 4500 tons of steel. Other contracts are pending, two or three of which are about to be closed. A total of 35,000 tons of steel is involved.

Reports from motor car works have been increasingly favorable, following an April output that in some cases came near to capacity. The Ford schedule for June is set at 130,000 cars, while the estimate for May is 110,000 to 115,000.

Following the recent buying of pig iron by radiator and cast iron pipe companies, the tonnage of the latter aggregating about 75,000 of Southern at a substantial concession in price, the market is not so active, but a number of price advances have been recorded, including 50c. on Southern iron, which is now on a basis of \$17.50, Birmingham, \$2 to \$3 on steel-making iron at Pittsburgh and \$2 on silvery of one maker. One Cleveland company advanced foundry pig iron \$2, or to \$24. The outlook is, however, that the advance in quotations will not continue unless the strike should prove much more serious in the near future, for Buffalo iron is now to be had at \$22 base for third quarter delivery, or somewhat lower than recent quotations for prompt delivery. Unusual movements are a shipment of basic from Alabama to Youngstown and 7600 tons of Buffalo iron to Chicago by water. Stocks of Southern iron show a large decrease for April.

Japan is making a new record as a buyer of rails from the United States. An order for 10,800 tons of 75-lb. rails and accessories placed in the past week is the third for this year, and a further inquiry for 10,600 tons is pending.

An advance in steel bars raises THE IRON AGE composite price of finished steel to 2.098c. per lb., the highest since the same figure was reached Dec. 20, 1921, during the recession of prices from the peak of 1920. Pig iron is the highest, at \$23.46, in more than a year, having had the same average on April 26, 1921.

## Pittsburgh

### Pig Iron Advances Due to Strike—Steel Bar Minimum Is Now 1.60c

PITTSBURGH, PA., May 9.

On the whole, conservative influences predominate in the iron and steel market here, and while the supply situation is extremely tight and the trend of prices unmistakably upward, there is comparatively little disposition on the part of producers to exact higher prices than appear warranted by the higher cost entailed in the present fuel situation. Sharply higher prices have been established on practically all grades of pig iron, notably the steel making grades, which have advanced from \$2 to \$3 per ton since a week ago. There is a marked scarcity in the available supply of Bessemer and basic irons, and the cost of production has been increased by at least \$3 per ton by the recent enhancement in coke prices.

Semi-finished steel is at least \$1 a ton higher than a week ago, and the available supply is so scant that even higher prices appear likely before there can be any relief through a larger and cheaper supply of fuel. Those seeking early shipments of sheets usually find makers demanding at least \$5 per ton over the

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 9, 1922	May 2, 1922	Apr. 11, 1922	May 10, 1921
No. 2X, Philadelphia...	<del>\$26.24</del>	\$25.40	\$22.34	\$25.84
No. 2, Valley furnace...	<del>24.00</del>	23.00	20.00	23.50
No. 2, Southern, Cin'tif...	<del>22.00</del>	21.50	20.00	26.50
No. 2, Birmingham, Ala. f...	<del>17.50</del>	17.00	15.50	22.00
No. 2 foundry, Chicago*	22.00	22.00	20.00	23.00
Basic, del'd, eastern Pa...	23.50	23.50	21.00	25.00
Basic, Valley furnace...	<del>25.00</del>	23.00	19.00	22.00
Valley Bess., del. Pitts...	<del>26.00</del>	23.96	21.96	25.96
Malleable, Chicago*	22.00	22.00	20.00	23.00
Malleable, Valley	<del>24.50</del>	23.00	19.50	24.00
Gray forge, Pittsburgh...	<del>25.40</del>	24.46	21.71	23.46
L. S. charcoal, Chicago...	28.00	28.00	26.00	37.50
Ferromanganese, seaboard.	65.00	65.00	62.50	85.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh...	<del>33.00</del>	32.00	29.50	37.00
O.-h. billets, Pittsburgh...	<del>33.00</del>	32.00	29.50	37.00
O.-h. sheet bars, P'gh...	<del>35.00</del>	33.00	31.00	39.00
Forging billets, base, P'gh	37.00	37.00	34.50	42.00
O.-h. billets, Phila...	<del>37.24</del>	36.74	35.24	42.74
Wire rods, Pittsburgh...	38.00	38.00	38.00	48.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb...	1.50	1.50	1.50	2.20
Light rails at mill...	1.50	1.50	1.50	2.20
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	1.96	1.96	1.81	2.35
Iron bars, Chicago...	1.65	1.65	1.60	2.38
Steel bars, Pittsburgh...	<del>1.40</del>	1.50	1.50	2.10
Steel bars, Chicago...	<del>1.65</del>	1.60	1.60	2.48
Steel bars, New York...	1.88	1.88	1.88	2.48
Tank plates, Pittsburgh...	1.50	1.50	1.50	2.20
Tank plates, Chicago...	<del>1.65</del>	1.60	1.60	2.58
Tank plates, New York...	1.88	1.88	1.78	2.58
Beams, Pittsburgh...	1.50	1.50	1.50	2.20
Beams, Chicago...	<del>1.65</del>	1.60	1.60	2.58
Beams, New York...	1.88	1.88	1.88	2.58
Steel hoops, Pittsburgh...	2.00	2.00	1.90	2.75
*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.				
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.				
The prices in the above table are for domestic delivery and do not necessarily apply to export business.				
Sheets, Nails and Wire,	May 9, 1922	May 2, 1922	Apr. 11, 1922	May 10, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	4.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	5.00
Sheets, blue an'd, 9 & 10	2.40	2.40	2.40	3.10
Wire nails, Pittsburgh...	2.40	2.40	2.40	3.00
Plain wire, Pittsburgh...	2.25	2.25	2.25	3.00
Barbed wire, galv., P'gh...	3.05	3.05	3.05	4.10
Tin plate, 100-lb. box, P'gh	\$4.75	\$4.75	\$4.75	\$6.25
Old Material, Per Gross Ton:				
Carwheels, Chicago	<del>\$18.50</del>	\$19.50	\$18.25	\$15.00
Carwheels, Philadelphia	<del>16.50</del>	16.00	15.75	16.00
Heavy steel scrap, P'gh...	<del>17.50</del>	17.00	16.00	13.00
Heavy steel scrap, Phila...	14.50	14.50	14.00	12.00
Heavy steel scrap, Ch'go.	15.25	15.25	13.25	11.50
No. 1 cast, Pittsburgh...	18.50	18.50	16.50	18.00
No. 1 cast, Philadelphia...	<del>18.50</del>	18.00	17.00	18.00
No. 1 cast, Ch'go (net ton)	16.25	16.25	14.75	13.50
No. 1 RR. wrot, Phila...	<del>17.00</del>	16.50	16.00	15.00
No. 1 RR. wrot, Ch'go (net)	13.00	13.00	11.75	10.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	\$6.00	\$6.00	\$4.00	\$3.25
Foundry coke, prompt...	6.00	6.00	4.75	4.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.00	13.00	12.87½	12.75
Electrolytic copper, refinery	12.75	12.75	12.62½	12.50
Zinc, St. Louis...	5.00	5.02½	4.92½	4.95
Zinc, New York...	5.35	5.37½	5.27½	5.45
Lead, St. Louis...	5.15	5.25	4.80	5.00
Lead, New York...	5.35	5.40	5.00	5.00
Tin (Straits), New York...	30.62½	31.25	30.50	32.25
Antimony (Asiatic), N. Y.	5.37½	5.37½	4.75	5.25

### Composite Price, May 9, 1922, Finished Steel, 2.098c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 88 per cent of the United States output of finished steel	May 2, 1922, 2.084c. April 11, 1922, 2.084c. May 10, 1921, 2.764c. 10-year pre-war average, 1.689c.
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### Composite Price, May 9, 1922, Pig Iron, \$23.46 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	May 2, 1922, \$22.23 April 11, 1922, 19.14 May 10, 1921, 22.80 10-year pre-war average, 15.72
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regular market quotations, while we note sales of cold-rolled strips at 4c. base, Pittsburgh, on tonnages for quick delivery as compared with 3.65c., the regular market price, and 3.50c. at which the bulk of the orders now on makers' books are priced. On merchant steel bars 1.60c. base now appears to be the minimum on current transactions involving specified delivery.

The steel industry is less hampered by a shortage of coal than of coke, and even the latter is available if buyers want to go high enough for it. The steel companies operating their own by-product plants cannot produce coke anywhere nearly as cheaply from coal from the Southern fields as they can from the product of western Pennsylvania. The little beehive oven coke that is coming upon the market is not available at less than \$6 per net ton, at ovens, while on a basis of about \$6 per ton delivered on Southern coal, and at least one and three-tenths tons of coal to produce a ton of by-product coke, minimum the cost would be \$7.80. These prices add very materially to the cost of making pig iron and naturally this is passed along into steel making costs. There are only two ways out for the makers of steel—either to get correspond-

ingly higher prices for their product or gradually let production go down, to the exhaustion of fuel supplies and stocks of raw materials. Since there is no sign at present of an early break-up of the coal strike, there is a marked disinclination on the part of steel makers to sell into the last half of the year. The Steel Corporation, notably its principal steel making subsidiary in this district, is getting heavy shipments of coal from the Southern fields. At the Clairton by-product plant of this company at least 30,000 tons of coal is lying in barges in the Monongahela river and in one delivery recently no less than 1200 carloads reached that plant by rail. It has opened up a new storage yard at Lock Run, a short distance from the Clairton plant, and of 3000 carloads of coal strung along the Panhandle division of the Pennsylvania railroad, all but about 200 carloads were said to be consigned to the Steel Corporation at Pittsburgh.

The Carnegie Steel Co. to-night will start up two idle blast furnaces at its Mingo, Ohio, works. It is understood the coke for these furnaces will come from an Alabama by-product plant. This will make 34

of 59 furnaces of this company active. The Pittsburgh Steel Co. on May 4 banked its one active furnace while the Shenango Furnace Co. again is making iron at its No. 2 furnace recently banked.

**Pig Iron.**—Prices have moved up with considerable rapidity in the past week, but the advances have been accomplished more as a result of light supplies and increased producing costs, due to the high cost of coke, than because of a big demand. A Valley steel maker is reported to have paid \$25 to a neighboring Valley company for 5000 tons of basic iron and no iron now is available at less than that price. The same buyer is credited with having purchased 500 tons of Southern basic as a trial at a price of \$24.44, delivered. The freight rate from Birmingham to point of consumption was \$6.94 and the cost of iron at furnace was \$17.50. It is reported also that a substantial tonnage of basic recently was sold by a Cleveland furnace interest at \$25, Cleveland. Bessemer iron also has been advanced to \$25, Valley furnace, this representing a rise of \$3 from the recent nominal quotation. No sales are noted at this price, but it is as low as any makers now will go on direct business and even higher prices have been quoted on inquiries from middlemen. Justification for the advance in this grade is claimed through the big advance in coke, on both spot or contract tonnages. The minimum price on foundry iron now is \$24, Valley furnace, for No. 2 grade, this being based on a fair-sized sale of No. 2X grade at \$24.50. A sanitary ware interest recently closed for 10,000 tons of Southern iron for third quarter delivery, paying \$17.50, Birmingham, for the base grade and 60c. more for 2.25 to 2.75 silicon iron. This interest is negotiating for some fairly large tonnages of Northern iron for June and third quarter delivery. The supply situation generally is very taut, as steel makers feel they need such iron as they have on their yards, while merchant producers are cautious about selling very far ahead until the fuel situation is more clarified. The Shenango Furnace Co., in starting up its No. 3 furnace, is doing so largely to care for orders already booked. As soon as the present blast is completed, work on the renewal and enlargement of this furnace will go forward. Work preliminary to the changes already is under way.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic .....	\$25.00
Bessemer .....	25.00
Gray forge .....	\$23.50 to 24.50
No. 2 foundry .....	24.00 to 25.00
No. 3 foundry .....	23.50 to 24.50
Malleable .....	24.50

**Ferroalloys.**—English makers of ferromanganese have partly met the advance announced a few weeks ago by domestic producers by an increase of \$2.50 per ton to \$67.50 c.i.f. Atlantic seaboard for 80 per cent material. Demand for this alloy is not heavy, but is fairly constant for small tonnages to supplement deliveries on contracted supplies. Such sales of domestic material are being made at \$70 Atlantic seaboard. Jackson, Ohio, producers of Bessemer ferrosilicon and silvery iron have made still another advance, this time of \$2 per ton, making the total advance in the past month \$5 per ton. There is little interest in spiegeleisen, which nominally is quoted at \$35 furnace, for 19 to 21 per cent, and \$34 furnace for 16 to 19 per cent, by the principal maker now in production. These prices are at least \$5 per ton above the basis of the most recent sales. Interest also is slight in 50 per cent ferrosilicon, as consumers are covered by long time contracts and presumably are getting ample supplies.

We quote 78 to 82 per cent ferromanganese, \$70 to \$72.50 c.i.f. Atlantic seaboard for domestic and \$67.50 for English. Average 20 per cent spiegeleisen, \$35 furnace; 16 to 19 per cent, \$34 furnace; 50 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$41.50; 11 per cent, \$44.80; 12 per cent, \$48.10; 13 per cent, \$52.10; 14 per cent, \$57.10; silvery iron, 6 per cent, \$30; 7 per cent, \$31; 8 per cent, \$32.50; 9 per cent, \$34.50; 10 per cent, \$36.50; 11 per cent, \$39; 12 per cent, \$41.50. The present freight rate from Jackson to New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

**Iron and Steel Pipe.**—The market is decidedly firm on steel pipe on the basis of the Dec. 15, 1921, card, and it is safe to say that as much, if not more, business is

being refused than is going on makers' books. There is still considerable uncertainty as to the duration of the coal miners' strike and pending a definite turn for the better in this situation, all makers are extremely cautious about adding to their obligations. Production in the Youngstown district has suffered through the inability of makers to obtain sufficient supplies of coke to get out a full tonnage of Bessemer iron. Bessemer steel plants of both of the pipe companies in that district lately have been down. There is a moderate but very well sustained increase in the demand for wrought iron pipe, and the possibility of lower prices now seems rather remote because of that fact and also because of the increases in cost due to the shortage and higher prices of fuel. Discounts are given on page 1321.

**Wire Rods.**—Inquiries are fewer than they were recently, but this does not disturb the strength of prices, because production does not exceed present requirements, and there is no surplus for open market sale. Quotations are nominal and the first sale of any consequence is likely to be at well above \$38 for the base size of soft rods, because at that price they are out of line with billet prices. Quotations are given on page 1321.

**Wire Products.**—The market reflects a slightly less insistent demand, which is ascribable largely to the fact that requirements of agricultural districts have been pretty well satisfied. Demand for nails is good and is expected to hold up well throughout the summer. Manufacturers still have fairly heavy obligations and are not anxious to sell very far ahead, pending a definite turn for the better in the coal situation. Efforts on the part of the independents to obtain the advances made about a month ago on new business are hampered by the failure of the American Steel & Wire Co. to adopt those advances.

We quote wire nails at \$2.40 to \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.25 base per 100 lb., Pittsburgh.

**Billets, Sheet Bars and Slabs.**—There is a lively inquiry for sheet bars and also a good deal of looking round for other kinds of semi-finished steel, chiefly by brokers representing non-integrated manufacturers, unable to obtain from their regular sources of supply, as much material as they would like to have in keeping with their orders for finished products. Actual business, however, remains extremely limited because most producers are committed as heavily as they care to be so long as the fuel situation remains as uncertain as at present. It is doubtful whether sheet bars could be bought to-day at less than \$35, Pittsburgh or Youngstown, but this is somewhat more than either sheet or tin plate makers can afford to pay on the basis of the finished products. Quotations are an appraisal of the present market. A recent inquiry for 3000 tons of 1½-in. billets from a Valley maker of hoops and bands brought out a quotation of \$35 f.o.b. a western Pennsylvania mill.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at \$33 to \$34; 2 x 2-in. billets, \$34 to \$35; Bessemer and open-hearth sheet bars, \$35; slabs, \$33 to \$34; forging billets, ordinary carbons, \$37 to \$39, all f.o.b. Youngstown or Pittsburgh mills.

**Iron and Steel Bars.**—The market is extremely strong on steel bars and 1.60c. now is the more common minimum, although the Steel Corporation is unwilling to say that it would not take business at 1.50c. Some makers are asking as high as 1.70c. and are quoting 1.75c. on sales out of stock. We note one sale of 500 tons, partly Bessemer and partly open-hearth, at 1.60c. There has been no change in iron bars, but an advance appears likely because of the higher market in pig iron.

We quote steel bars rolled from billets at 1.50c. to 1.70c.; reinforcing bars, rolled from billets, 1.50c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.50c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

**Steel Skelp.**—There is a marked shortage of available supplies and so little business is possible under the circumstances that only an appraisal of prices is possible. One Pittsburgh district pipe maker recently had to put off a furnace through inability to secure skelp, and a Youngstown producer, ordinarily self-con-

tained, lately has been actively seeking outside supplies. Such shipments as are being made on contracts are on the basis of 1.50c., but it is doubtful whether new business could be placed at less than 1.60c.

**Sheets.**—Practically all makers are finding some difficulty in keeping abreast of their obligations because of the shortage of sheet bars and yet there appear to be supplies from some independent mills for prompt delivery for those willing to pay an advance of \$5 a ton over the regular quotations. It now seems probable that considerable second quarter business will be carried into the third quarter and until makers know just how they stand, there is a disposition to refuse business calling for delivery after July 1. The American Sheet & Tinplate Co. again is scheduled for about 90 per cent operations of its sheet mills, but may not attain this mark because of the scarcity of steel. Independents also feel the steel shortage. Prices are given on page 1321.

**Structural Material.**—Local fabricating companies are figuring against a good volume of business and awards are fairly numerous but almost entirely of small tonnages. Plain material is very firm with 1.50c. the absolute minimum and 1.60c. to 1.70c. the more common quotations of the independent producers. Prices are given on page 1321.

**Plates.**—New business is not developing as heavily in this product as in some others, because buyers generally are well covered against their immediate requirements. Most makers have fair-sized backlogs and are not especially anxious for additional tonnages. There is no change in the prices except that 1.50c. is not acceptable to independents on new business.

We quote sheared plates,  $\frac{1}{4}$  in. and heavier, tank quality, at 1.50c. to 1.70c., f.o.b. Pittsburgh.

**Steel Rails.**—Actual business in light rails remains of moderate proportions, although in the past week or so a number of fair sized inquiries have come out from coal mine operators who figure that the present suspension of mining operations affords a good time to prepare for the future. All makers of these sections, rolled from new steel, are holding firmly to 1.50c. base.

We quote 25 to 45-lb. sections, rolled from new steel, 1.50c. base; rolled from old rails, 1.40c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

**Boiler Tubes.**—Business has improved, but not as much nor as rapidly as was the case with pipe. The best showing is in seamless steel tubes, makers of which stopped cutting prices several weeks ago. The result has been to impress buyers with the stability of the market. A supplementary discount of 5 per cent on top of the regular card discount on lap welded steel tubes still is being given, but the Eastern interest which a short time ago gave as much as three fives beyond the card now is back at the card discount, plus 5 per cent. Iron boiler tubes are selling fairly well, but there is still room for much improvement. Discounts are given on page 1321.

**Cold-Finished Steel Bars and Shafting.**—The Cumberland Steel Co., effective May 2, advanced prices of ground shafting \$3 per ton to 2.40c. base, mill, for carloads, and 2.65c. base for less carloads. There has been no change in prices of cold-rolled or drawn bars or shafting, the common quotation being 1.90c. base, Pittsburgh, for carloads, and 2.15c. base for less carloads. Consumers are specifying fairly freely and there is a fair amount of new inquiry. Buyers who have to have early tonnages probably would have difficulty in obtaining them at less than 2c. base for carload lots, since such business would mean the payment of premiums for early shipments of hot-rolled bars. Really urgent demands, however, are lacking.

**Rivets.**—The volume of new orders still is good and while shipments are being made at the old prices of \$2.10 and \$2.20 base per 100-lb. Pittsburgh, and in some instances less, these prices have practically disappeared as far as new business is concerned. Pittsburgh makers cannot yet compete with Chicago makers on Middle Western and Western business unless they absorb some of the freight. Chicago prices are only \$3 per ton over the Pittsburgh base prices and the

freight differential in favor of Chicago is \$7.60 per ton. Plant activities here have not yet been affected by the steel situation, except that bookings warrant an expansion which is prevented by the fact that the mills cannot increase bar and rod shipments. Prices and discounts are given on page 1321.

**Cut Nails.**—A fairly good demand is observed. The Wheeling Steel Products Co. is quoting \$3 base per 100 lbs., mill, for carloads, while the Reading Iron Co. is quoting \$2.75, mill, for carloads. Less than carloads are 10c. per 100 lb. more with both companies.

**Coke and Coal.**—So little coal is being mined in the western Pennsylvania fields that the chief market is still in coal from the Southern fields. Kentucky coal now is quotable from \$3 to \$3.25 f.o.b. mines, for mine-run grade, while the range in the southern West Virginia field is from \$2.90 to \$3. Small lots of nearby coal coming on the market command from \$3.25 to \$3.50 at mines. Prices are just about 100 per cent higher than those just prior to April 1. Very little bee-hive oven coke is being produced, but demands are correspondingly small and prices do not change much. Generally both furnace and foundry grades are selling at \$6, net, to the producer, but there are occasional sales of furnace coke as high as \$6.50, and of foundry coke at \$6.75 and even \$7.

**Old Material.**—As far as sales to consumers are concerned, \$17.50 per gross ton, delivered, represents the top of the market on heavy melting steel in this district, and it also is the minimum since dealers have paid \$18 for railroad material of this classification, and those who have bought at \$17.50 probably would be willing to pay that price if they now were in the market. Purchase of railroad scrap at \$18 is largely speculative, as dealers are well covered against previous sales and went high for the most recent offering, on the theory that before they were obliged to provide shipping instructions there might be an outlet for it. Although the fuel situation as it relates to coke is not mending to any appreciable extent, and there must be improvement in this respect before the steel makers can be freed of their dependence on scrap through enlarged pig iron production, there is a feeling in conservative quarters that present prices are reasonably high and that future sales at much above current levels are going to be rather difficult. For the first time in about two years, there has been some trading lately in this market in busheling scrap, which some of the steel makers lately have been charging into blast furnaces to increase the flow of hot metal. We note sales in this district of No. 1 busheling at \$13 to \$14, and No. 2 busheling has brought about the same prices in Youngstown. Steel foundry grades are fairly active and strong, but the gray iron jobbing foundries are not very busy and are not buying much scrap. The Baltimore & Ohio Railroad, W. S. Galloway, purchasing agent, Baltimore, will receive bids until noon, May 15, on 14 cars and 13,275 gross tons of old material; also on 3000 lb. of high speed steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$17.50
No. 1 cast, cupola size.....	\$18.50 to 19.00
Re-rolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa. ....	17.00 to 17.50
Compressed sheet steel.....	15.00 to 15.50
Bundled sheets, sides and ends.....	14.00 to 14.50
Railroad knuckles and couplers.....	17.50 to 18.00
Railroad coil and leaf springs.....	17.50 to 18.00
Low phosphorus standard bloom and billet ends.....	20.00 to 21.00
Low phosphorus plates and other grades.....	19.00 to 20.00
Railroad malleable.....	16.00 to 16.50
Iron car axles.....	25.00 to 26.00
Locomotive axles, steel.....	23.00 to 24.00
Steel car axles.....	17.50 to 18.00
Cast iron wheels.....	17.00 to 17.50
Rolled steel wheels.....	17.50 to 18.00
Machine shop turnings.....	13.00 to 13.50
Sheet bar crop ends.....	18.00 to 18.50
Heavy steel axle turnings.....	15.00 to 15.50
Short shoveling turnings.....	14.00 to 14.50
Heavy breakable cast.....	17.25 to 17.75
Stove plate.....	13.50 to 14.00
Cast iron borings.....	14.00 to 14.50
No. 1 railroad wrought.....	13.00 to 14.00
No. 1 busheling.....	13.00 to 14.00

## Chicago

### Demand Less Active — Buffalo Pig Iron Shipped by Water

CHICAGO, May 9.

Demand has subsided somewhat in both the pig iron and finished steel markets. Considerable business is still being booked, but it is not comparable in volume to that placed in previous weeks. A slackening of demand was not entirely a source of surprise to the trade, as it was felt that buying could not continue indefinitely at the active rate of the past month and a half. A pause in activity will simply mean that buyers have covered their needs for some time ahead, and it is to be noted that producers likewise are heavily booked.

Prices are still showing strength and they are expected to remain firm in view of the backlog of mills and furnaces and the limitations on production imposed by the coal strike. Plates, shapes and bars, in fact, have advanced to a minimum of 1.65c., Chicago, and considerably higher prices are being paid when early delivery is sought.

The coal strike has not yet resulted in a curtailment of mill operations in this district, but it is preventing any expansion in production beyond the present rate. The strike has now been in effect for six weeks and while local producers still have considerable fuel in stock, they feel that they must continue to use it carefully until a resumption of mine operations is in sight. The Illinois Steel Co. remains on an 86 per cent operating basis while the Inland Steel Co. continues to operate at 67 per cent of capacity. Wire mills and bolt and nut plants dependent on rod and bar mills for raw material are limited in their operations by deliveries. Already Western jobbers are finding it exceedingly difficult to obtain barbed wire, plain wire and staples, because wire mills have fallen behind in output.

**Ferroalloys.**—Ferromanganese has advanced to a minimum of \$67.50, f.o.b. New Orleans. The market is quiet.

We quote 78 to 82 per cent ferromanganese, \$75.90 to \$80.40, delivered; 50 per cent ferrosilicon, \$55, delivered; spiegelisen, 16 to 18 per cent, \$46.50, delivered.

**Cast Iron Pipe.**—New business is not so plentiful, but prices are stronger, having advanced to a minimum of \$35.50, base Birmingham, for 6-in. and larger, with some makers quoting \$36. Awards include:

Milwaukee, 6930 tons, to United States Cast Iron Pipe & Foundry Co.

Akron, Ohio, 1500 tons, to United States Cast Iron Pipe & Foundry Co.

**Inquiries are:**

Chicago, 570 tons of 8-in., bids to be in May 9.

Harvard, Ill., 400 tons of 4 to 12-in., to be let to contractor May 11.

Lacrosse, Wis., 100 tons, May 10.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$48.60 to \$49.10; 6-in. and above, \$44.60 to \$45.10; class A and gas pipe, \$3 extra.

**Pig Iron.**—Buying is not so active as in recent weeks, but this is not surprising, in view of heavy orders which have been placed. It might be said that users are now fairly well covered and sellers are very comfortably booked. A third Iroquois furnace is being blown in this week and the output of this stack, as well as of all the other active furnaces of the leading merchant, is committed through the remainder of the quarter. At the same time, this seller has a substantial backlog extending through last half. Prices of northern iron are unchanged, but some No. 1 foundry is being sold at as high as \$1.50 above the base price for No. 2 foundry. An unusual development in the local market is the appearance of Buffalo iron shipped here by water. On May 5 the Steamer John J. Boland of the Boland & Cornelius line arrived in the Chicago River with 7600 tons of pig iron purchased by Hickman, Williams & Co. from the Lackawanna Steel Co. A considerable part of this tonnage has been sold and is now being distributed among consumers in this vicinity. A second consignment of the tonnage purchased from the Lackawanna furnaces may be diverted to another market instead of being shipped to Chicago

as originally planned. Current inquiries include 400 tons of foundry wanted by a Belvidere, Ill., melter for June delivery, 500 tons for prompt shipment to a Michigan stove maker, and 600 tons for third quarter delivery inquired for by a Racine foundry. Southern iron has advanced to a minimum of \$17.50 base, Birmingham. The Chicago delivered price on Southern foundry for shipment by water and rail is 75c. less than that taking the all-rail route. One Jackson County silvery maker has announced another advance of \$2 a ton, making 8 per cent \$32.50, furnace. Low phosphorus is also stronger, although no sales are reported in this territory.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	\$28.00
Northern coke, No. 1, sil. 2.25 to 2.75.....	\$22.50 to 24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25.....	22.00
Northern high phos.....	22.00
Southern No. 2.....	23.42 to 24.17
Malleable, not over 2.25 sil.....	22.00
Basic.....	22.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free.....	33.00 to 34.00
Silvery, sil. 8 per cent.....	35.82 to 37.82

**Rails and Track Supplies.**—The Big Four, which took bids on track supplies as reported in our Cincinnati column last week, has placed 50,000 tie plates with the Inland Steel Co. and 148,000 with the Railroad Supply Co. The demand for track supplies is still active, but it is thought that some roads have now covered most of their requirements for this year and that buying from now on will not be so general as heretofore. Some mills are quoting a minimum of 2.25c. and 3.25c., Pittsburgh, on spikes and bolts respectively, but they are still available from at least one source at 2.50c. and 3.50c., Chicago, respectively.

Standard Bessemer and open hearth rails, \$40; light rails rolled from new steel, 1.50c., f.o.b. makers' mills.

Standard railroad spikes, 2.12c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.12c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.85c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

**Bolts and Nuts.**—Buying is subsiding somewhat, but this is accounted for by the fact that many users covered heavily on the eve of the advance. Except for occasional shading by makers not yet fully booked, the new discounts are firm. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1321.

Jobbers quote structural rivets, 3c.; boiler rivets, 3.10c.; machine bolts up to 3/4 x 4 in., 60 and 10 per cent off; larger sizes, 60 off; carriage bolts up to 3/4 x 6 in., 60 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagon tapped, \$3.50 off; blank nuts, \$3.75 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off. Quantity extras are unchanged.

**Structural Material.**—Plain material has advanced to a minimum of 1.65c., Chicago, for shipment at mill's convenience and considerable business is being closed at prices ranging from \$1 to \$2 per ton higher. In some instances, in fact, consumers are finding it necessary to place orders with Eastern mills at Pittsburgh base prices. Both local producers are so heavily booked that the buyer desiring material for early needs is in a difficult position. Fabricating awards for the week are numerous and a number of attractive inquiries are pending.

The mill quotation on plain material is 1.65c. to 1.75c., Chicago. Jobbers quote 2.48c. for plain material out of warehouse.

**Sheets.**—Demand remains active, but the prices of local producers remain unchanged. The local independent is booked three months ahead.

Mill quotations are 3.15c. for No. 28 black, 2.40c. for No. 10 blue annealed and 4.15 for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote blue annealed, 3.53c.; black, 4.30c.; galvanized, 5.30c.

**Steel Castings.**—All except about 2000 tons of the miscellaneous castings for railroad cars on order have been placed. In practically every case, the discounts recently published by the leading interests were adhered to.

**Wire Products.**—Mills have fallen several weeks behind on deliveries of barbed wire and fencing, but are still able to keep pace with the demand for nails. Buying remains active and mills could expand their operations if they could secure a sufficient supply of rods.

For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1321.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.10 per 100 lb.; No. 9 and heavier bright basic wire, \$3.25 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails, \$2.75 per keg.

**Bars.**—Soft steel bars are higher, the current market ranging from 1.65c. to 1.75c., Chicago. Mills are heavily booked and delivery earlier than two or three months hence is difficult to obtain. The leading interest, in fact, will make no definite promises as to delivery, but is selling for immediate specification and shipment at mill's convenience. A round tonnage of bar iron is being placed, but mills have not acquired backlogs comparable with those of mills producing soft steel. Prices are strong at 1.65c. to 1.70c., Chicago.

Mill prices are: Mild steel bars, 1.65c. to 1.75c., Chicago; common bar iron, 1.65c. to 1.70c., Chicago; rail carbon, 1.60c. mill or Chicago.

Jobbers quote 2.38c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.30c. for rounds and 3.80c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.20c. base. Hoops, 3.23c. Bands, 2.98c.

**Old Materials.**—With demand falling off and dealers' yard stock coming onto the market, prices are growing weaker and in some cases have declined. It is felt in some quarters that this is a temporary pause in buying and that prices will go still higher, while others hold the contrary view that the market has reached the top and will remain at this level for a time or take a swing downward. It is to be noted, however, that the conditions which caused steel producers to make heavy purchasers of open-hearth grades have not changed and their buying has been one of the chief supports of the market. Railroad lists include the Northern Pacific, 2500 tons, the Great Northern, 2000 tons, and the Grand Trunk, 2800 tons. The quotations for machine shop turnings and cast borings in the issue of May 4 were erroneously transposed. The prices which should have been quoted for that issue are \$8.50 to \$9 for machine shop turnings and \$10.50 to \$11 for cast borings.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton		
Iron rails	.....	\$18.50 to \$19.00
Cast iron car wheels	.....	18.50 to 19.00
Relaying rails	.....	22.50 to 27.50
Rolled or forged steel car wheels	.....	17.50 to 18.00
Steel rails, rerolling	.....	16.00 to 16.50
Steel rails, less than 3 ft.	.....	16.25 to 16.75
Heavy melting steel	.....	15.25 to 15.75
Frogs, switches and guards cut apart	.....	15.25 to 15.75
Shoveling steel	.....	14.75 to 15.25
Low phos., heavy melting steel	.....	18.00 to 18.50
Drop forge flashings	.....	11.00 to 11.50
Hydraulic compressed sheet	.....	12.50 to 13.00
Axle turnings	.....	12.50 to 13.00
Per Net Ton		
Iron angles and splice bars	.....	17.00 to 17.50
Steel angle bars	.....	14.00 to 14.50
Iron arch bars and transoms	.....	17.50 to 18.00
Iron car axles	.....	22.50 to 23.00
Steel car axles	.....	15.50 to 16.00
No. 1 busheling	.....	12.00 to 12.50
No. 2 busheling	.....	7.50 to 8.00
Cut forge	.....	13.50 to 14.00
Pipes and flues	.....	10.25 to 10.75
No. 1 railroad wrought	.....	13.00 to 13.50
No. 2 railroad wrought	.....	13.50 to 14.00
Steel knuckles and couplers	.....	15.00 to 15.50
Coil springs	.....	16.00 to 16.50
No. 1 machinery cast	.....	16.25 to 16.75
No. 1 railroad cast	.....	15.75 to 16.25
Low phos. punchings	.....	15.00 to 15.50
Locomotive tires, smooth	.....	13.00 to 13.50
Machine shop turnings	.....	8.00 to 8.50
Cast borings	.....	10.25 to 10.75
Stove plate	.....	14.00 to 14.50
Grate bars	.....	13.50 to 14.00
Brake shoes	.....	13.50 to 14.00
Railroad malleable	.....	15.00 to 15.50
Agricultural malleable	.....	15.00 to 15.50

**Reinforcing Bars.**—Construction activity involving the use of reinforcing bars shows no signs of subsiding. Current lettings include:

Victory Mill & Elevator Co., warehouse, Wichita, Kan., 400 tons, to Concrete Steel Co.

Lincoln warehouse, Milwaukee, 350 tons, to Corrugated Bar Co. Fenske Furniture Co. building, Chicago, 200 tons, to Truscon Steel Co.

Four school buildings, Muskogee, Okla., 200 tons, to Concrete Steel Co.

Highway work, Winnebago County, Ill., 100 tons, to Corrugated Bar Co.

Illinois Central, grade reduction work, Matteson, Ill., 150 tons, to Corrugated Bar Co.

**Inquiries include:**

Cedar Rapids, Iowa, reservoir, 300 tons.

Riverside pumping station, Milwaukee, 200 tons.

**Plates.**—The market has advanced to a minimum of 1.65c., Chicago, on plates placed for delivery at mill's convenience. The Inland Steel Co., which can make earlier shipment than other mills, has been booking considerable tonnage at 1.80c., Chicago. Mills are closing no contracts, business being taken only when accompanied by specifications.

The mill quotation is 1.65c. to 1.80c., Chicago. Jobbers quote 2.48c. for plates out of stock.

## STRUCTURAL BUSINESS

### Awards Announced and Tonnages Pending in Leading Centers

Structural awards the past week are as follows:

Apartment building, Fifth Avenue and Tenth Street, New York, 350 tons, to A. E. Norton.

Miscellaneous repairs for the New York Central, 400 tons, the King Bridge Co. low bidder.

Bridges for the Baltimore & Ohio, 350 tons, to the McClintic-Marshall Co.

Thomas Jefferson high school, Brooklyn, 2100 tons, to the McClintic-Marshall Co.

Steel for the subway at Houston, Tex., 650 tons, to the American Bridge Co.

Four buildings for the Johns-Manville Co. at Waukegan, Ill., 2200 tons, to the American Bridge Co.

Hotel at 119 West Fortieth Street, New York, 1800 tons, to the Belmont Iron Works.

Webster apartment house, West Thirty-fourth Street, New York, 1100 tons, to the Levering & Garrigues Co.

Laboratory for Tufts College, Somerville, Mass., 200 tons, to the New England Structural Steel Co.

Office building, Fifty-seventh Street and Fifth Avenue, New York, 700 tons, to the Hay Foundry & Iron Works.

General Hospital at Elizabeth, N. J., 700 tons, to Bigelow & Nichols.

Apartment building, East Fifty-second Street, New York, 700 tons, to the Hinkle Iron Co.

Omaha & Council Bluffs Street Railway & Bridge Co., bridge across Missouri River, 3150 tons, to Mt. Vernon Bridge Co.

Theodore Roosevelt High School, Des Moines, Iowa, 442 tons, to Pittsburgh-Des Moines Steel Co.

Masonic Home, Decoto, Cal., 600 tons, to Dyer Brothers Iron Works, San Francisco.

Union League Building, San Francisco, 250 tons, to Western Iron Works.

Raeder Tabernacle, Chicago, 216 tons, to American Bridge Co.

Warehouse, The Sugarland Industries, Sugarland, Texas, 143 tons, to unnamed fabricator.

Educational building, Southwest Missouri State Teachers' College, Springfield, Mo., 116 tons, to Illinois Steel Bridge Co.

Kansas Wesleyan University, building, Salina, Kan., 200 tons, to Saint Joseph Structural Steel Co.

Tainter gates for hydroelectric dam, Tony, Wis., 111 tons, to Worden-Allen Co.

St. Mary's School, Newulm, Minn., 100 tons, to St. Paul Foundry Co.

A bridge at Omaha, Neb., 3000 tons, to Mt. Vernon Bridge Co.

Bank building for the Alverdo Building Co., Pontiac, Mich., 240 tons, to Whitehead & Kales, Detroit.

Washington Gladden high school, Columbus, Ohio, 500 tons, general contract awarded to the D. W. McGrath Construction Co., Columbus, Ohio.

### Structural Tonnages Pending

Enlargement basement and sub-basement, Fair Store, Chicago, 2500 tons.

Auditorium and Market House, Memphis, Tenn., 700 tons, bids to be taken for second time, May 27.

City of Green Bay, Wis., Strauss type bascule bridge at Main Street, 800 tons, bids to close May 29.

Woodland Avenue bank building for the Cleveland Trust Co., 200 tons.

McKinney Steel Co., Cleveland, addition to coke quenching station, 150 tons.

Superior Lakeview Market, Cleveland, 200 tons, bids taken.

Buffalo Athletic Club, Buffalo, bids being taken for general contract.

## New York

### Pig Iron Prices for Third Quarter Somewhat Lower Than for Prompt Delivery

NEW YORK, May 9.

**Pig Iron.**—Buffalo iron can now be had on a basis of \$22 for No. 2 plain, \$22.50 for No. 2X and \$23.50 for No. 1X for third quarter, these prices being somewhat below the usual prices for prompt delivery. The recent schedule on eastern Pennsylvania, \$24 for No. 2 plain, \$24.50 for No. 2X and \$25.50 for No. 1X, is maintained. The strike of coal miners is causing very little anxiety. There is a general feeling that probably another month will pass before there are definite developments.

It is understood that the remaining stock of a steel company which had a very large accumulation does not include much foundry iron.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25...	\$27.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25...	26.52
Buffalo, sil. 1.75 to 2.25.....	\$27.46 to 27.96
No. 2 Virginia, sil. 1.75 to 2.25.....	28.56

**Ferroalloys.**—British sellers of ferromanganese have advanced their price from \$65 to \$67.50, seaboard, effective May 8. Previous to this very large sales of moderate tonnages are reported to have been made for early and later deliveries. It is quite apparent that the foreign alloy is supplying the greater part of the demand. Sales of around 300 to 400 tons are reported with the market quiet and steady at the regular quotations. There is absolutely no demand for manganese ore and prices are nominal. There has been a steady business in small and moderate sized lots of 50 per cent ferrosilicon at prevailing values and the same is true of ferrochrome. Quotations are as follows:

#### Ferroalloys

Ferromanganese, domestic, seaboard, per ton...	\$70.00
Ferromanganese, British, seaboard, per ton...	\$67.50
Spiegeleisen, 16 to 19 per cent, furnace, per ton...	\$34.00
Spiegeleisen, 20 per cent.....	\$35.00
Ferrosilicon, 50 per cent, delivered, per ton,	\$57.00 to \$60.00
Ferrotungsten, per lb. of contained metal, 40c. to 50c.	
Ferrochromium, 6 to 8 per cent carbon, 60 to	
70 per cent Cr., per lb. Cr., delivered....	12c. to 14c.
Ferrovandium, per lb. of contained vanadium...	\$4.00

#### Ores

Manganese ore, foreign, per unit, seaboard, 25c. to 26c.	
Tungsten ore, per unit, in 60 per cent concentrates .....	\$2.00 up
Chrome ore, basis 48 per cent Cr <sub>2</sub> O <sub>3</sub> , crude, per unit, Atlantic seaboard.....	40c. to 45c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS <sub>2</sub> , New York.....	40c. to 45c.

**Finished Iron and Steel.**—Two marked tendencies pervade the market as a whole. Several large companies are turning down orders either because they are fully booked or because of the uncertainties of the future, due to the coal situation and the possible difficulty in making deliveries on contracts. Some other interests, better situated as to the coal situation, find some consumers holding back, but report a fair demand for most of their products. The price tendency in all departments is strong and firm, but the market as a whole continues quiet, following the heavy buying of recent weeks. Discrimination by sellers as to business they are willing to take is becoming a more important factor each week. Independent sellers of plates are easily obtaining 1.60c., Pittsburgh, and, although it is admitted that 1.50c. can be done in certain other cases, if the consumer desires early delivery 1.60c. is the minimum. Sales are reported at 1.60c., but not in large tonnages. A fair business is reported in bars from both consumers and warehouses, the latter being fairly active buyers in the past week. A fair amount of small inquiries for plates, shapes and wire products is noted. It is stated that bids on the 7500 to 10,000 tons of plates, shapes and bars for the New York Central must be in by May 16 with delivery between that date and the last of June. The material is said to be for use wholly in car repairs. Conditions reported last

week as ruling in bars, sheets and wire products as to deliveries continue to prevail. The most active market is still the structural, with total contracts placed amounting to about 10,000 tons. Spikes continue firm at 2.15c. per lb., Pittsburgh, and sheets are obtainable at 2.40c. for blue annealed, 3.15c. for black and 4.15c. for galvanized, base Pittsburgh.

We quote for mill shipments, New York, as follows: Soft steel bars, plates and structural shapes, 1.88c. to 2.08c.; bar iron, 1.88c. On export shipments the freight rate is 28.5c. per 100 lb. and the domestic rate is 38c.

**Warehouse Business.**—Prices, generally, are considerably stronger than for some time. The present mill quotation of about 1.60c. per lb. base, Pittsburgh, has again narrowed the margin between warehouse and mill quotations until jobbers are once more looking forward to an advance in this district. The stiffening of prices has resulted in the elimination by most warehouses of any reductions on large orders. While 4c. and 5c. per lb. could still be done on a good-sized purchase of black or galvanized sheets, the leading independent interest is holding firmly to 4.25c. per lb. and 5.25c. per lb. base on black and galvanized. One warehouse, which, until recently, has been granting concessions on large orders of all kinds of material, is now holding firmly to quoted prices, which in its case are 2.53c. per lb. on bars and 2.63c. per lb. on structural material and plates. To this price an additional charge is made for delivery of 25c. per 100-lb. on lots of less than 500 lb., 10c. per 100-lb. on lots of from 500 to 990 lb. and 5c. per 100-lb. on lots of 990 lb. to 1990 lb. The market in wrought iron and steel pipe is a little firmer but no immediate increase in prices is yet foreseen. Brass and copper warehouses report active business and prices firm. We quote prices on page 1338.

**High Speed Steel.**—Although sales of high carbon tool steel begin to show a slight increase, high speed steel is still practically devoid of any activity. Quotations are still on a basis of 75c. to 80c. per lb. for 18 per cent tungsten, with special brands of some companies selling up to 95c. per lb.

**Cast Iron Pipe.**—Foundries are operating at close to 100 per cent of capacity. Private purchasing continues heavy, although there is a temporary lull in municipal lettings. The Department of Water Supply of Holyoke, Mass., opened May 10, bids on 900 tons of 24-in. pipe. The United States Cast Iron Pipe & Foundry Co. has been awarded 7000 tons by Atlanta, Ga. While prices are extremely stiff, no upward revision has yet been made. We quote per net ton, f.o.b. New York, in car-load lots, as follows: 6-in. and larger, \$48.80; 4-in. and 5-in., \$53.50; 3-in., \$63.80, with \$4 additional for Class A and gas pipe.

**Coke.**—Some foundry coke has been sold as low as \$6.25, ovens, but \$7 is the usual asking price. There is no great rush to buy and foundries seem to be getting along very comfortably. The Oxford furnace of the Replogle Steel Co. was blown out Saturday on account of inability to obtain coke, but it is expected that another Replogle furnace will soon be blown in. Prices on by-product coke remain at \$8.50 seaboard with freight from Newark, N. J., at \$1 on the Erie and Lackawanna, \$1.68 on the Pennsylvania and \$2.24 on the Central of New Jersey.

**Old Material.**—Activity has not been so great during the past week, as during the preceding weeks, but the trend of prices is still upward. Bids on two railroad lists, one from the Delaware, Lackawanna & Western, the other from the Lehigh Valley Railroad, opened this week. On No. 1 heavy melting steel, although as high as \$17.50 has been paid by dealers in Pittsburgh and \$15 per ton for Johnstown, these are believed to have been in all cases, purchases for contracts at lower prices. Purchases of consumers in Johnstown have not yet exceeded \$14.75 per ton, as far as is known. A recent price of \$15.50 per ton Williamsport, Pa., on a tonnage of rerolling rails, justifies the quotation of \$11.50 to \$12 per ton, as a buying price, New York. Mixed borings and turnings have been active and the price is from \$7 to \$7.50, 50c. per ton advance over last week's quotation. On machine shop turnings, \$11.50, Harrisburg, has been done during the past week. Dealers

in this district are inclined to predict that heavy melting steel will probably reach \$19 per ton, before any weakness is exhibited.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$9.75 to \$10.25
Steel rails, short lengths, or equivalent .....	11.50 to 12.00
Rerolling rails .....	11.50 to 12.00
Relaying rails, nominal.....	27.00 to 28.00
Steel car axes.....	11.50 to 12.00
Iron car axles.....	19.00 to 20.00
No. 1 railroad wrought.....	11.00 to 11.50
Wrought iron track.....	10.50 to 11.00
Forge fire .....	7.00 to 7.50
No. 1 yard wrought, long.....	10.50 to 11.00
Cast borings (clean).....	7.25 to 7.75
Machine-shop turnings .....	6.75 to 7.25
Mixed borings and turnings.....	7.00 to 7.50
Iron and steel p.p.e. (1 in. diam., not under 2 ft. long).....	9.25 to 9.75
Stove plate .....	9.75 to 10.25
Locomotive grate bars.....	10.75 to 11.25
Malleable cast (railroad).....	9.00 to 9.50
Cast-iron car wheels.....	12.00 to 12.50

Prices which dealers in New York and Brooklyn are quoted to local foundries, per gross ton, follow:

No. 1 machinery cast.....	18.00 to 19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	16.50 to 17.00
No. 1 heavy cast, not cupola size.....	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.) .....	11.50 to 12.00

## Philadelphia

### Prices of Finished Material Advancing—Newport News Company Low Bidder on Cars

PHILADELPHIA, May 9.

While output of steel by Eastern mills has not been affected by coal shortage due to the miners' strike, it is becoming increasingly difficult for consumers to place orders with assurance of early delivery. The leading interest is reported to be taking business in some instances with shipment to be at mill convenience, but most of the independents are refraining from making sales unless they can offer definite promise of fairly early shipment. The mills continue to sell in a very cautious way, and some are turning down business except from their regular customers.

Prices are stiffening and from 1.60c. to 1.75c., Pittsburgh, is being paid for small lots of plates, shapes and bars for early delivery. In semi-finished steel premium prices have been paid, as, for example, \$39.50 and \$40, Pittsburgh, for forging billets, which is fully \$10 a ton above the prices recently ruling.

Demand for pig iron has lessened somewhat, but prices continue to strengthen.

**Pig Iron.**—Neither inquiry for nor sales of foundry pig iron in the past week equalled that of preceding weeks. There has been a fair volume of business, mostly in small lots for early shipment, but large consumers seem to have covered their requirements for the immediate future. The largest purchase was made by a soil pipe foundry, which closed for 3000 tons or more for two of its Eastern plants. The tone of the iron market is easier, in so far as the willingness of furnaces to sell is concerned, but is stronger as regards prices. Foundry iron has been generally advanced to a minimum of \$24, furnace, for No. 2 plain, \$25 for No. 2X and \$26.50 for No. 1X, while some furnaces are asking 50c. a ton above these prices. The Replogle Steel Co. has sold a few thousand tons of foundry iron in anticipation of the blowing in of one of its Wharton, N. J., furnaces on May 16. Anxiety over the supply of furnace coke seems to have disappeared, and unless some new element, not now foreseen, should develop in the coal and coke situation, it is not likely that any of the Eastern furnaces will be obliged to bank or blow out. The Oxford furnace of the Replogle Steel Co. has gone out, but this production will be more than offset by that of the Wharton furnace soon to come in. Some Buffalo iron is being sold for shipment into the Philadelphia district at the full price of \$23, base, Buffalo, plus a freight rate of \$5.46. In one instance a consumer requiring sand-cast iron, which could not be obtained in this district, paid about \$30, delivered, for a carload of Buffalo iron. There is no activity in steel-making grades. The Reading Iron Co., which inquired for

10,000 tons of gray forge, is reported not to have bought because of inability to get iron free from copper.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.....	\$25.26 to \$25.40
East. Pa. No. 2X, 2.25 to 2.75 sil.....	26.26 to 26.40
East. Pa. No. 1X.....	27.76 to 27.84
Virginia No. 2 plain, 1.75 to 2.25 sil.....	27.74 to 28.24
Virginia No. 2X, 2.25 to 2.75 sil.....	28.24 to 28.74
Basic delivery eastern Pa.....	23.50 to 25.25
Gray forge .....	24.00 to 25.00
Malleable .....	25.50
Standard low phos. (f.o.b. furnace)...	30.00
Copper bearing low phos. (f.o.b. furnace) .....	30.00

**Ferroalloys.**—A few thousand tons of ferromanganese has been sold in the past week by agents of the British producers, whose price remains at \$65, Atlantic seaboard, though there are intimations of an advance shortly. Domestic producers are quoting \$70, seaboard, but are taking practically no business. The Lavino Furnace Co. may blow out its one active stack because of the coke situation.

**Semi-Finished Steel.**—A leading independent has advanced prices of semi-finished steel to the following schedule: Open-hearth rerolling billets, 4 x 4 in. and heavier, \$31.50; forging billets, \$36.50; slabs, \$32.50; sheet bars, \$33, all f.o.b. Pittsburgh. Sales have been made by other companies at prices higher than this schedule, \$39.50 and \$40, Pittsburgh, having been paid for forging billets for quick shipment, while \$32 has been paid for rerolling billets and \$35 for sheet bars.

**Plates.**—No large plate tonnages have been placed in the past week, but Eastern mills continue to book a fair volume of orders in small lots. There is a good demand for boiler steel. Several of the Eastern plate mills are operating at about 50 per cent, which is the best rate of production since 1920. Independent mills are firm at 1.60c., Pittsburgh, while on some small orders 1.70c. and 1.75c., Pittsburgh, have been paid. The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., was low bidder on cars for the Chesapeake & Ohio Railroad.

**Structural Material.**—Some mills report more tonnage being offered than they care to accept. Even with the exercise of caution in booking orders, the aggregate tonnage being put on mills' books is in excess of current shipments. The market is firm at 1.60c., Pittsburgh, for plain material, with some mills quoting 1.65c. and 1.70c.

**Bars.**—The demand for steel bars exceeds that of any of the heavy tonnage products. Mills are turning away more business than they are accepting. The price quoted by independent mills continues firm at 1.60c., Pittsburgh, with higher prices being paid on some small lots. Bar iron is quoted at 1.60c., Pittsburgh, for carload lots and 1.70c. for less than carloads.

**Track Supplies.**—The Pennsylvania Railroad has placed an order for 450,000 tie plates (2800 tons).

**Bolts, Nuts and Rivets.**—Specifications on contracts are fairly heavy and shipments are increasing. The recent advance in prices is being firmly maintained by Eastern makers.

**Warehouse Business.**—Prices quoted by Philadelphia warehouses on local delivery are as follows:

Soft steel bars and small shapes, 2.46c.; iron bars (except bands), 2.36c.; round edge iron, 2.55c.; round edge steel, iron finish, 1½ x ½ in., 2.55c.; round edge steel planished, 3.30c.; tank steel plates, ¼-in. and heavier, 2.56c.; tank steel plates, 3/16-in., 2.72c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.50c.; structural shapes, 2.56c.; diamond pattern plates, ¼-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3c.; squares and hexagons, cold-rolled steel, 3.50c.; steel hoops, No. 13 gage and lighter, 3.21c.; steel bands, No. 12 gage to 3/16-in., inclusive, 2.96c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.; tire steel, 2.65c.; planished tire steel, 3.40c.

**Coke.**—Foundry coke is being sold at \$6.25 to \$7, Connellsville.

**Old Material.**—Prices of various grades of old material continue to advance. Although heavy melting steel has not been sold above \$15 for delivery in this district, quotations have been put out by brokers at

\$15.50 and \$16. Among the grades which have advanced in the past week are low phosphorus steel, cast iron car wheels, No. 1 railroad wrought, No. 1 cast, stove plate and railroad malleable.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$14.50 to \$15.00
Scrap rails .....	14.50 to 15.00
Steel rails, rerolling.....	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	21.00 to 22.00
Cast iron car wheels.....	16.50 to 17.50
No. 1 yard wrought.....	15.00 to 15.50
No. 1 railroad wrought.....	17.00 to 17.50
No. 1 forge fire.....	12.50 to 13.00
Bundled sheets (for steel works)....	12.50 to 13.00
No. 1 busheling.....	14.50 to 15.00
No. 2 busheling.....	11.00 to 12.00
Turnings (short shoveling grade for blast furnace use).....	12.00 to 12.50
Mixed borings and turnings (for blast furnace use) .....	11.50 to 12.00
Machine-shop turnings (for steel works use) .....	12.50 to 13.00
Machine-shop turnings (for rolling mill use) .....	13.00 to 13.50
Heavy axle turnings (or equivalent)	13.00 to 14.00
Cast borings (for steel works and rolling mills) .....	13.00 to 13.50
Cast borings (for chemical plants)....	15.50 to 16.00
No. 1 cast.....	18.50 to 19.00
Railroad grate bars.....	14.50 to 15.00
Stove plate (for steel plant use).....	15.00 to 15.50
Railroad malleable .....	13.00 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications).....	14.50 to 15.00
Shafting .....	19.00 to 20.00

## St. Louis

ST. LOUIS, May 9.

**Pig Iron.**—The demand for pig iron continues active, although sales were not so heavy as the previous week. The let up in buying is most noticeable in basic, steel mills in the district having bought heavily within the last few weeks. The markers of pig iron seem to be pretty well booked up with orders, and it is often difficult to place business, this being especially true of high silicon iron. The market has advanced to \$22, Chicago, for Northern iron, and \$17 to \$18, Birmingham for Southern iron, the Sheffield maker quoting \$17.50, Birmingham, for either water and rail or all-rail shipment. Producers of pig iron are going slow about accepting business, as some of them feel that they have already accepted a greater volume than they should have at the low price. One of the outstanding features of the situation is the increasing melt. The big steel plants in the district are operating on a more satisfactory basis. The American Steel Foundries is now operating three open-hearth furnaces at Granite City and one in East St. Louis; the National Enameling & Stamping Co. has four furnaces in operation, the Commonwealth Steel Co. two, while the Scullin Steel Co. is operating four of its open-hearth furnaces and rolling mill. The stove plants in the district are selling more stoves and making more, and the job foundries are for the most part busier than they have been for some time. The principal pending inquiry is for 2000 tons for a Terre Haute melter. A Texas foundry wants 500 tons, and there are smaller inquiries from a carload to 300 and 400 tons.

We quote delivered consumers yards, St. Louis, as follows, having added to furnace prices \$2.80 freight from Chicago and \$5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25...	\$24.80
Northern malleable, sil. 1.75 to 2.25..	24.80
Basic .....	24.80
Southern foundry, all rail, sil. 1.75 to 2.25 .....	\$22.74 to 23.74
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis.....	21.74

**Finished Iron and Steel.**—The principal letting of structural steel of the week went to the Fort Pitt Bridge Co., Pittsburgh, being the 2500 tons of structural steel for the first unit of the Cahokia plant of the Union Electric Light & Power Co. The inquiries from the railroads have suddenly dropped off, and there is a lull in the demand from other sources, a condition welcomed temporarily by the steel manufacturers, who are well sold up for some time. The Mobile & Ohio order for 40,000 pairs of angle bars went to the Illinois Steel Co., which latter company also divided equally with the Edgewater Steel Co., Vernon, Pa., the order of the Wabash Railway for 400

wheels. A Kansas City tank manufacturer is in the market for 500 tons of plates. Warehouse business is heavy.

For stock out of warehouse we quote: Soft steel bars, 2.37½c. per lb.; iron bars, 2.37½c.; structural shapes, 2.47½c.; tank plates, 2.47½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.25c.; structural rivets, \$3.09½ per 100 lb.; boiler rivets, \$3.19½; tank rivets, 7/16-in. and smaller, 65 and 5 per cent off list; machine-bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, \$4; and tapped, \$3.75 off list.

**Coke.**—The market for coke continues active. Connellsville coke has advanced to \$7, which is an advance of \$2.75 a ton since March 3. The demand for local by-product coke continues good. St. Louis by-product coke and St. Louis gas coke for domestic use have been reduced in price for May to \$9.75 and \$9 respectively and a drive for business made through advertisements in the daily newspapers.

**Old Material.**—Consumers of old material in the district were not so heavy buyers within the last week, with the result that the recent advances were halted on most items. The lull in buying is regarded as only temporary in view of the increase in operations in the district and the strength in the pig iron and steel markets. Railroad lists before the market this week include the Frisco, 1400 tons and the Mobile & Ohio, 1900 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails.....	\$16.75 to \$17.25
Steel rails, rerolling.....	16.00 to 16.50
Steel rails, less than 3 ft.....	15.50 to 16.00
Relaying rails, standard section.....	25.00 to 30.00
Cast iron car wheels.....	18.00 to 18.50
No. 1 railroad heavy melting steel.....	14.50 to 15.00
No. 1 heavy shoveling steel.....	13.00 to 13.50
Frogs, switches and guards, cut apart	15.25 to 15.75
Per Net Ton	
Heavy axle and tire turnings.....	9.50 to 10.00
Steel angle bars.....	13.50 to 14.00
Iron car axles.....	23.00 to 23.50
Steel car axles.....	17.00 to 17.50
Wrought iron bars and transoms.....	18.00 to 18.50
No. 1 railroad wrought.....	13.00 to 13.50
No. 2 railroad wrought.....	12.00 to 12.50
Railroad springs .....	15.50 to 16.00
Steel couplers and knuckles.....	15.50 to 16.00
Cast iron borings.....	8.50 to 9.00
No. 1 busheling.....	11.00 to 11.50
No. 1 railroad cast.....	16.00 to 16.50
Stove plate and light cast.....	12.75 to 13.25
Railroad malleable .....	13.00 to 13.50
Pipe and flues.....	8.50 to 9.00
Machine shop turnings.....	6.50 to 7.00

## Birmingham

BIRMINGHAM, ALA., May 9.

**Pig Iron.**—At the beginning of the second week of May there was no pig iron to be bought of any Alabama maker under \$17.50. This applied as well to largest as to smallest company, although a substantial concession is understood to have been made in one recent transaction of large size. One maker booked 25,000 tons the first week of May. Another booked 15,000 tons on a one-furnace make at \$17.50 for third quarter in a week after opening for that period. The largest maker and three others were out of the market after taking all the third quarter iron desired. The maker taking 15,000 tons of basic for a Western steel mill booked 15,000 more tons last week at the base of \$17.50. This maker is so thoroughly out of market for the present that he names a price of \$18.50 with the idea that for the present that will be prohibitive. He does not wish to book any more third quarter iron. Three makers are fully half filled for third quarter already. General merchant interest was rather pleased than not that the United States Cast Iron Pipe & Foundry Co. placed orders for 75,000 tons with the Tennessee company because, as they see it, this removed competition from the market usually engendered when this pipe concern parcels out tonnage among various makers. Buying was from every quarter. Virginia pipe makers took lots of 1000 tons at \$17.50. Middle Western consumers of many kinds were in the market. Toward the close of the week buying was not so heavy, but the market was just about as strong as could be. Yard holdings have decreased. On April and May 1,

they were as follows: Foundry, 59,000 and 41,000 tons; machine cast, 28,000 and 20,000; warrants, 660 and 1600; basic, 17,000 and 18,000; total, 105,000 and 81,000. Total on yards Jan. 1 was 160,000 tons. Reduction since that date has been 80,000 tons. The largest individual holdings are 20,000 tons and no other has over 5000 tons. The Woodward Iron Co. now has orders for basic that will keep one stack on it for three months. More basic is applying for booking and it would not surprise if the leading interest lands a considerable amount of it to be made in the two stacks now being rushed in the completion of being rebuilt.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$17.50
Basic .....	\$17.00 to 17.50
Charcoal, warm blast.....	30.00

**Cast Iron Pipe.**—United States Cast Iron Pipe & Foundry Co. was awarded 9000 tons of water pipe, principally 48 in., by the city of Atlanta, besides 1200 for Akron and other new business. Demand shows no abating and the new base of \$35 is firm. Movements to Pacific Coast for port and inland distribution are continuous. Sanitary pipe base of \$45 was advanced by Central Foundry Co. to \$50. Others had not yet followed example. Most sanitary makers are on full turn with bookings to capacity for 30 to 60 days and are deaf to clamors of jobbers from over the country for prompt shipment. Pacific Coast is a busy inquirer.

**Finishing Mills.**—The Tennessee company is on full ingot production turn and on double turn in structural and tie-plate mills, also at Bessemer guide, bar and plate mills. Chickasaw Shipbuilding & Car Co.'s plant has all it can care for. Wire drawing mills continue at 70 to 75 per cent and over and steel hoop and band mills are busy. There is prospect of export business in structural steel and welded steel products now under consideration.

**Coal and Coke.**—Coke is as firm as could be at \$5.50. More could be gotten, but makers remain conservative. Demand for far Western delivery increases. Delivery is ten days to two weeks late. Coal production remains under that of March owing to heavy stocking up and failure of demand from distressed territory.

**Old Material.**—Business in scrap is fairly good as regards cast, but dealers are holding heavy steel for higher prices.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails .....	\$13.00 to \$14.00
No. 1 steel.....	12.00 to 13.00
No. 1 cast.....	14.00 to 15.00
Car wheels .....	13.00 to 14.00
Tramcar wheels .....	12.00 to 13.00
No. 1 wrought.....	11.00 to 12.00
Stove plate .....	12.00 to 13.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	4.00 to 5.00

## Buffalo

BUFFALO, May 8.

**Pig Iron.**—No difficulty has been encountered by the furnaces having iron to sell, in obtaining \$23 for their product, but in some instances the price on No. 2 plain has been \$22. These sales have been to regular customers and the fact that \$22 was made is not an indication of a weakening market. About 8000 tons have been sold including various foundry grades, some malleable and basic. Inquiry is strong and an inquiry for a tonnage of basic iron in excess of 5000 tons is interesting one furnace. The 50c. differential continues. There is no change in the selling line-up. Rogers, Brown & Co. are considering blowing in another furnace to augment their present blowing capacity of two stacks.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.....	\$23.00 to \$24.00
No. 2X foundry, 2.25 to 2.75 sil.....	22.50 to 23.50
No. 2 plain, 1.75 to 2.25 sil.....	22.00 to 23.00
Basic .....	23.50
Malleable .....	23.50
Lake Superior charcoal.....	28.14

**Finished Iron and Steel.**—One interest is taking occasional orders for bars. Though in the general sense it is out of the market, it is reported to have sold sev-

eral lots at 1.50c. where the rolling of this material was in agreement with mill schedules. There is no general change, however, and the continuation of the coal strike is bound to affect the operation program within a very short time. A sheet mill is taking occasional business and quoting 3.15c. to regular customers with a slightly higher figure to others. The operation is close to 100 per cent. Some sales of billets and wire rods are noted by a mill and wire business is strong. No sales for delivery beyond second quarter have appeared. Wire prices may advance, some sellers believe, but the move to advance them will not originate here. Structural business is slow and inquiry has fallen off. Bids have been closed on the Knowlton warehouse project, but the steel requirements have not been publicly made known.

We quote warehouse prices, f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; soft steel bars, 2.55c.; hoops, 3.30c.; bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.40c.; black sheets, No. 28, 4.40c.; cold-rolled strip steel, 5.80c.; cold-rolled round shafting, 3.35c.

**Old Material.**—The market is much livelier and several big tonnages have been moved. A lively demand for railroad malleable has appeared and generally dealers are disposed to release some of their stocks. Prices have strengthened—in several commodities the advances have been larger than ordinary. Most of the sales have been for tonnages less than 1000 tons, but in the main much material has been sold. Production, too, is better.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$16.50 to \$17.00
Low phos., 0.04 and under.....	17.50 to 18.50
No. 1 railroad wrought.....	16.00 to 16.50
Car wheels .....	17.00 to 18.00
Machine shop turnings.....	10.50 to 11.00
Cast iron borings.....	11.50 to 12.00
Heavy axle turnings.....	13.50 to 14.00
Grate bars .....	14.00 to 14.50
No. 1 busheling.....	14.00 to 14.50
Stove plate .....	15.00 to 15.50
Bundled sheet stampings.....	10.00 to 11.00
No. 1 machinery cast.....	18.00 to 18.50
Hydraulic compressed .....	14.25 to 14.75
Railroad malleable .....	16.00 to 17.00

## Cleveland

**Pig Iron Sold at Higher Prices—Activity in Lake Ship Building**

CLEVELAND, May 9.

**Iron Ore.**—Shippers are still awaiting action by the Interstate Commerce Commission on rail rates before naming ore prices and have been unable to obtain any definite information as to when a rate decision is to be announced. A leading independent interest operating a number of properties on the Mesabi range has advanced miners' wages in that district to the Steel Corporation scale or from \$2.75 to \$3.25 per day for common labor. Similar action may be taken by some other mining companies that reduced wages when they started up their mines earlier in the year. Some of the independent steel companies are now shipping ore, but the Steel Corporation has not yet started a boat. There was over 1,000,000 fewer tons of ore on Lake Erie docks May 1 than on the same date last year, the amount being 6,988,878 gross tons as compared with 8,093,854 tons on May 1, 1921. April shipments were 674,126 tons as compared with 282,371 tons during April last year. April receipts were 35,366 tons at Lake Erie ports, 27,441 at Lake Michigan ports and 19,769 at lake front furnaces at Lake Erie ports.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

**Pig Iron.**—Prices have further advanced and the market continues fairly active, although foundry iron orders are not as numerous as they were a week or two ago. There was considerable activity in basic iron during the week and the price has been well established at \$25. Earlier in the week, a Valley consumer bought 2000 tons of basic from a near-by furnace at \$24 and 1200 tons of high and low silicon basic from a lake furnace at \$23 at furnace. An offer of \$24 for 5000 tons of Bessemer was turned down, but a \$25

quotation by another producer for a smaller lot did not result in an order. A wide range of prices is appearing on foundry iron. This grade has sold at \$24.50, Valley furnace, for a 500-ton lot, but \$24 is generally accepted as the present market price in the Valley district. Quotations by lake furnaces range from \$22.50 to \$23.50, although the \$22 price evidently has not entirely disappeared. A local furnace reports sales at \$23 both for local and outside shipment. One lake furnace during the week sold 12,000 tons, mostly in foundry iron in lots of 500 tons and under. Some of this business, including a lot of 1,000 tons bought by an Indiana melter, was for the third quarter. A number of sales of low phosphorus iron aggregating over 1000 tons have been made at \$32 and one lot brought \$32.50. The Globe Iron Co., has made another advance on Ohio silvery iron, marking its price up \$2 per ton. Local selling agencies have so far not received any announcement of an advance by other makers of silvery iron. The Otis Steel Co., placed one of its blast furnaces in operation Monday. The McKinney Steel Co. now has two furnaces in blast, having resumed the operation of one stack which had been banked about 30 days. One Cleveland producer has advanced foundry iron to \$24 and has made a number of sales at that price, including a 1500-ton lot taken by a northern Ohio consumer. The same interest quoted \$26 on a 5000-ton lot of basic.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations except basic are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic, Valley furnace.....	\$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25..	\$22.50 to 23.00
Southern fdy., sil. 1.75 to 2.25.....	23.67
Ohio silvery, sil. 8 per cent.....	33.86 to 35.86
Standard low phos., Valley furnace..	32.00 to 32.50

**Sheets.**—There is a good demand from the automobile field for blue annealed and automobile body sheets, a number of sales in lots up to 500 tons being reported at the April price. Sales at higher prices are scarce, although a 150-ton lot of black sheets was sold at 3.50c. Many consumers in the automobile field have evidently about used up their stocks purchased before the April price advance.

**Semi-Finished Material.**—With little semi-finished steel available from many sources of supply, the demand is heavy and a local mill during the week booked a number of orders for sheet bars in lots up to 5000 tons at \$35, and took some slab orders at that same price. Several carload sales of forging billets have been made at \$37, Pittsburgh. The McKinney Steel Co., which started six open-hearth furnaces last week, will put five additional furnaces in operation this week.

**Finished Material.**—The predominating feature of the market is the development of considerable activity in the lake shipbuilding industry. One lake freighter has been placed and contracts for other large lake boats are pending, two or three of which are apparently about ready to be closed, all involving approximately 35,000 tons of steel. The boat ordered was a 610-ft. freighter placed by the Kinsman Transit Co. with a Toledo shipbuilding company for 1923 delivery, and will require 4500 tons of plates and shapes which have been placed with a Pittsburgh district mill. There is also a decided improvement in the structural situation. The Union Trust Co. to-day announced that it will go ahead this year with the construction of its large bank building, the structural steel for which was placed a year ago. It is reported that the Thompson & Starrett Co. will be given the contract, although confirmation is lacking. The erection of this building will necessitate the purchase of possibly 2000 tons of sheet steel piling and reinforcing bars. Mills are getting a good volume of business largely in bar products in lots up to over 1000 tons from bolt, nut and rivet manufacturers, makers of car equipment and manufacturers of automobile parts. Mills are getting heavy specifications on orders placed before the price advance. In plates a new inquiry has come out for oil tanks for the Texas Co., requiring 3500 tons. There is an increase in the demand for oil country goods. The market has become calmer in respect to prices. The upward price tendency seems to have been checked to a large extent and buyers

are showing less anxiety. Generally 1.60c. is the prevailing price for steel bars, plates and structural material. While the 1.50c. price has not entirely disappeared, buyers of round lots are finding it increasingly difficult to place orders at that price. Some independent mills are quoting higher prices than 1.60c., but the higher prices are bringing out virtually no business except in plates. Sales of plates are being made at 1.75c., but mostly for boiler steel and other high-grade material. One local mill is booking orders for plates in lighter gages in small lots at 2c. Reinforcing bars are in light demand. Some business is being closed at 1.50c. on quotations made before the \$2 price advance.

Jobbers quote steel bars, 2.31c.; plates and structural shapes, 2.41c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.90c.; No. 28 galvanized sheets, 4.90c.; No. 10 blue annealed sheets 3.15c. to 3.21c.; hoops and bands, 2.81c.; cold-rolled rounds, 3c.; flats, squares and hexagons, 3.50c.

**Bolts, Nuts and Rivets.**—The demand for bolts and nuts continues fair, with orders well scattered among automobile manufacturers, railroads and jobbers. Prices are firm. While some makers are talking of an advance, others declare higher prices are improbable. Rivet orders have improved, but buying is in small lots. Local makers are adhering to 2.25c for structural, 2.35c for boiler and 70, 10 and 10 per cent off list for small rivets.

**Coke.**—A very limited amount of Connellsville foundry coke is being shipped to this territory. A few sales are being made at \$7 subject to the producer's ability to make deliveries, but inquiries are very light.

**Old Material.**—There is a fair demand for scrap for shipment to the Youngstown district from dealers who recently made short sales and steel making grades have further advanced 25c to 50c a ton. Dealers are paying \$17.25 for heavy melting steel; \$12.50 to \$13 for turnings and \$14 to \$14.25 for compressed steel delivered at Youngstown. There is no buying by Cleveland mills and virtually none by Youngstown mills. Better operation of malleable foundries has created some demand for railroad malleable scrap, which has advanced 50c.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$15.00 to 15.25
Steel rails, under 3 ft.....	15.50 to 15.75
Steel rails, rerolling.....	15.00 to 15.50
Iron rails.....	14.00 to 15.00
Iron car axles.....	18.00 to 19.00
Low phosphorus melting.....	15.75 to 16.25
Cast borings.....	11.75 to 12.00
Machine shop turnings.....	11.25 to 11.75
Mixed borings and short turnings.....	11.75 to 12.00
Compressed steel.....	12.00 to 12.25
Railroad wrought.....	14.00 to 14.50
Railroad malleable.....	15.50 to 16.00
Light bundled sheet stampings.....	10.00 to 10.25
Steel axle turnings.....	12.00 to 12.25
No. 1 cast.....	16.50 to 17.00
No. 1 busheling.....	10.50 to 11.00
Drop forge flashings over 10 in.....	11.00 to 11.50
Drop forge flashings under 10 in.....	11.25 to 11.75
Railroad grate bars.....	14.00 to 14.50
Stove plate.....	14.00 to 14.50
Pipes and flues.....	11.00 to 11.50

## Boston

BOSTON, May 9.

**Pig Iron.**—The opening of its third quarter books on a \$22 furnace base by a Buffalo iron maker, and a further strengthening in Alabama iron prices were the outstanding features of the market the past week. Sales of third quarter Buffalo iron to date consist of two lots, one of 500 tons silicon 2.25 to 2.75 at \$22.50, furnace, and one of 250 tons, silicon 1.75 to 2.25, at \$22, to Massachusetts foundries. Alabama iron, heretofore quoted \$16.50 furnace, is now \$17.50. On the new basis Alabama iron costs \$25.17 Boston or South Boston, \$26.74 Worcester, \$27.40 Springfield, and \$26.57 to \$26.70 Connecticut points, plus the loading charge, contrasted with \$28.06 for eastern Pennsylvania, silicon 1.75 to 2.25 delivered, and \$27.46 Buffalo No. 2 plain delivered, with Pennsylvania on a \$24 furnace base and Buffalo \$22. The relative cheapness of Alabama iron naturally has attracted some buying, but the turnover the past week was not important. Business in eastern Pennsylvania irons has been largely confined to small tonnages of special analysis on a basis of \$24 to \$25 furnace. Not enough Virginia iron is available

to constitute a market and quotations are purely nominal. Differentials on silicons are now generally uniform, the spread between No. 2 plain and No. 2X being 50c., and between No. 2X and No. 1X, \$1. Foundries in a few instances report furnaces, especially in the Buffalo district, unable to make shipments, necessitating duplicate tonnages of other irons. The recent purchase by the United Shoe Machinery Co. is a case in point.

We quote delivered at common New England points as follows, having added to furnace prices \$4.06 freight from eastern Pennsylvania, \$5.46 from Buffalo, \$6.58 from Virginia and \$10.66 from Alabama:

East. Pa., sil. 2.25 to 2.75.....	\$28.56 to \$29.56
East. Pa., sil. 1.75 to 2.25.....	28.06 to 29.06
Buffalo, sil. 2.25 to 2.75.....	27.96
Buffalo, sil. 1.75 to 2.25.....	27.46
Virginia, sil. 2.25 to 2.75.....	31.08
Virginia, sil. 1.75 to 2.25.....	30.58
Alabama, sil. 2.25 to 2.75.....	28.66
Alabama, sil. 1.75 to 2.25.....	28.16
*Alabama, sil. 2.25 to 2.75.....	25.67 to 27.90
*Alabama, sil. 1.75 to 2.25.....	25.17 to 27.40

†Figured on an all-rail rate. \*Figured on a rail and water rate.

**Warehouse Business.**—Conditions governing the warehouse business remain unchanged. Business is only moderately good in iron and steel, but apparently continues to forge ahead on small products. Prices are firm all along the line.

Jobbers quote: Soft steel bars, \$2.50½ per 100 lb. base; flats, \$3.15½; concrete bars, \$2.50 to \$2.78; structural steel, \$2.50½ to \$2.60½; tire steel, \$3.85 to \$4.25; open-hearth spring steel, \$4 to \$5.50; crucible spring steel, \$11.50; steel bands, \$3.00½ to \$3.53; hoop steel, \$3.41½; cold rolled steel, \$2 to \$3.50; refined iron, \$2.50½; best refined iron, \$4.25; Wayne iron, \$5.50; Norway iron, \$5.50; plates, \$2.65½ to \$2.83; No. 10 blue annealed sheets, \$3.48 per 100 lb. base; No. 28 black sheets, \$4.65; No. 28 galvanized sheets, \$5.65.

**Coke.**—The movement of by-product foundry coke from ovens in this territory to foundries, both on contract and for spot shipment, has slowed up somewhat due to the fact that most melters took in enough fuel last month to last for some time. New England coke producers, therefore, are up to date on deliveries. Melters outside New England continue to ask for quotations on local by-product coke, but comparatively few actual transactions are noted. For such shipments \$8 ovens has been named by producers. For New England consumption, contract foundry coke is quoted at \$10.25 delivered, and spot at \$10.50 a ton.

**Old Material.**—A considerable tonnage of heavy melting steel, borings and turnings has been moved out of New England the past week to Pennsylvania and New Jersey on old and new contracts. Dealers have been particularly successful in picking up tonnages in central and western Massachusetts. Drop forging interests have bought heavy shafting within the past few days, but business otherwise, for New England consumption, is light. Dealers in a few cases have paid 25c. a ton higher for heavy melting steel, and the market on borings and turnings is easily 50c. higher. Forged scrap and bundled skeleton values also have appreciated 50c. The market on machinery cast is about 50c. a ton firmer, not because of any increase in the demand, but purely in sympathy with the strength of other old material values. As a matter of fact, the call for machinery cast is fully as inactive as at any previous time this year.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$18.50 to \$19.00
No. 2 machinery cast.....	16.50 to 17.50
Stove plate.....	14.50 to 15.00
Railroad malleable.....	14.50 to 15.00
Car wheels.....	17.00 to 17.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$10.50 to \$11.25
No. 1 railroad wrought.....	11.00 to 12.00
No. 1 yard wrought.....	10.00 to 10.50
Wrought pipe (1-in. in diameter, over 2 ft. long).....	8.50 to 9.00
Machine shop turnings.....	7.00 to 7.50
Cast iron borings, rolling mill.....	7.50 to 8.00
Cast iron borings, chemical.....	10.00 to 10.50
Blast furnace borings and turnings.....	7.00 to 7.50
Forged scrap and bundled skeleton.....	6.50 to 7.00
Street car axles.....	12.50 to 13.00
Shafting.....	13.50 to 14.00
Rerolling rails.....	10.50 to 11.00

H. N. Taylor, president of N. & G. Taylor Co., delivered a lecture, illustrated by lantern slides, May 5, to the architectural students of the University of Pennsylvania on "Roofing Tin, Its Manufacture, Its Use, Its Advantages."

## Cincinnati

CINCINNATI, May 9.

**Pig Iron.**—Booking for third quarter is in healthy volume with Southern furnaces, but to date very few Northern furnaces have taken orders for shipment beyond July. Last week the market was active and the tonnages placed reached considerable proportions. A Kentucky sanitary company has placed 10,000 tons with three Southern furnaces for shipment during the third quarter, while a Tennessee producer booked from the Pittsburgh district alone a total of 3000 tons. Among other notable sales was one of 2000 tons of Southern iron to a Southern melter and 500 tons of Southern Ohio iron to a central Ohio foundry. An Indiana malleable consumer also placed an order for 1000 tons, the business going to a Chicago district stack. Prices continue to advance, Southern Ohio makers having gone up 50c. to \$23, Southern furnaces 50c. to a minimum of \$17.50, Birmingham, and silveries \$2 per ton to \$32.50 for 8 per cent. There are few inquiries before the trade, one from Indiana being for 600 to 1000 tons of Southern, and one from northern Ohio for 700 tons of foundry. A report is in circulation that Southern basic has been sold in the Valley district, the purchaser having been cut off from his normal supply by increased operations of the steel company owning the furnace.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$22.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	22.50
Ohio silvery, 8 per cent sil.....	35.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2).....	25.52
Basic Northern.....	25.02
Malleable.....	25.52

**Finished Material.**—There are a number of inquiries in the market, ranging from carloads to 100 tons of finished material, but the policy of the mills in carefully scrutinizing each inquiry is shown by the small number of orders actually being booked. Very few companies are taking business for other than regular customers, and it is expected that should the coal strike continue for several more weeks, there will be a serious scarcity of steel. Prices have an advancing tendency, which is probably better reflected in the prices being quoted for semi-finished products, which are from \$2 to \$5 higher than they were on April 1. Prices on bars, shapes and plates are holding steadily at 1.60c, but several mills during the week reported small orders taken at 1.70c. On sheets the market remains at 3.15c. for black and 4.15c. for galvanized, although some mills have advanced to 3.40c. and 4.40c., respectively. In wire products, orders during the week were fairly heavy, specialties having a fair call. There have been few new inquiries in the structural field. For the Washington Gladden High School building at Columbus, D. W. McGrath & Sons were awarded the general contract. This building will take 300 tons of structural steel and 800 tons of bars, which have not yet been placed. Bids are in on an addition to the Provident Bank Building, Cincinnati, taking 800 tons of steel, and also on repairs to the Music Hall at Cincinnati, involving 100 tons, but no awards have been made. It is understood a local fabricator has been given a contract for the erection of a Parcel Post building in Cincinnati, taking 800 tons of bars. An addition to the Middletown Hospital is now being figured and plans are under way for a new hotel building at Dayton, Ohio. The first unit in a group of buildings for the Dominican monastery at Cincinnati has been let, this work requiring 200 tons of reinforcing bars. The Ohio Falls Iron Co. will supply 1800 tons of bars for the Belknap Warehouse at Louisville, and has purchased 1000 tons of billets from which the bars will be rolled. Plant operations will not show much change, the schedules of last week being effective for this week.

**Warehouse Business.**—Local warehouses report business as very brisk, largely due to the fact that mills are turning down business as a result of the coal strike. Warehouse orders running as high as 30 tons are becoming more common. Prices are the same as quoted last week, but another advance is expected.

Jobbers of wire products report the demand as fairly active.

Jobbers quote: Iron and steel bars, 2.75c., base; hoops and bands, 3.35c., base; shapes and plates, 2.85c., base; reinforcing bars, 2.82½c., base; cold-rolled rounds, 3.35c.; flats, squares and hexagons, 3.85c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; common wire nails, \$2.75 per keg, base; No. 9 annealed wire, \$2.60 per 100 lb.

**Coke.**—A notable sale in the coke market was one of 25,000 tons of Indiana by-product fuel to a Valley furnace, a direct result of the coal strike situation. Demand for foundry grades is rather light in this district, although shipments on contracts are the heaviest for nearly two years. Prices are unchanged, Connellsville coke being quoted at \$6.50 to \$7, Wise County \$5.50 to \$6, and New River at \$7.50. The strike situation in the New River field is improving steadily and output of both coal and coke is higher than has been the case since April 1.

**Old Material.**—There is nothing new to report in the local scrap market. Demand is light and reports from other districts indicate that activity has lessened somewhat. Local dealers are marking time, and look upon the lull in buying as only temporary. Prices are unchanged.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	\$6.50 to \$7.00
Iron rails	13.50 to 14.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Rerolling steel rails	12.00 to 12.50
Heavy melting steel	11.50 to 12.00
Steel rails for melting	11.50 to 12.00
Car wheels	14.00 to 14.50
Per Net Ton	
No. 1 railroad wrought	11.00 to 11.50
Cast borings	6.00 to 6.50
Steel turnings	4.50 to 5.00
Railroad cast	14.00 to 14.50
No. 1 machinery	16.00 to 16.50
Burnt scrap	9.50 to 10.00
Iron axles	18.00 to 18.50
Locomotive tires (smooth inside)	11.00 to 11.50
Pipes and flues	5.50 to 6.00

### Prices of Refractories Are Holding

PITTSBURGH, May 8.—Prices of refractories are holding where they have been for several weeks, and while there still is more or less talk of an advance on the ground that current quotations mean no more than a new dollar for an old one, the demand hardly is strong enough to make an increase possible at this time. Indeed, all Pennsylvania makers of fire clay are not up to a minimum of \$32 for high duty grade, nor are all Pennsylvania makers insisting upon \$30 for silica.

Business as a whole is good, but this is by comparison with the conditions of 1921 rather than with those of the previous four or five years. It is commented upon, though, that it is hard to reconcile the reported activities of blast furnaces and steel works with the shipments of refractories, because the latter are not keeping up with the former. Evidently there is no tendency on the part of the iron and steel industry to anticipate requirements to any considerable extent. New business with those serving this immediate district has not been so heavy in the past fortnight as it was in March, but in other sections of the country it is reported to be holding up well. The explanation is that the coal strike has not had as much effect upon iron and steel production as it has had in Pittsburgh and nearby districts.

The latest report of the Refractories Manufacturers' Association, which is for March, shows that there was a slight gain in stock of fire clay brick due to the fact that production gained a little faster than shipments, and a gain in new orders evidently was cared for, since the unfilled orders as of March 31 were approximately the same as those one month before. In percentages of monthly producing economical capacity, production of fire clay brick was about 52 per cent, shipments about 48 per cent, stocks about 188 per cent, new orders about 55 per cent and unfilled orders 40 per cent.

Silica brick production in March was about 32 per cent of monthly economical producing capacity, ship-

ments about 29 per cent, stocks 135 per cent, new orders 30 per cent and unfilled orders 45 per cent. As compared with February, these figures show a gain of about 8 per cent in production, of about one per cent in shipments, of about 5 per cent in stocks, of 5 per cent in unfilled orders and new orders at about the same rate as at the end of February.

We quote per 1000 f.o.b. works:			
Fire Clay		High Duty	Moderate Duty
Pennsylvania	\$32.00 to \$35.00	\$30.00 to \$32.00	\$28.00 to \$30.00
Ohio	30.00 to 35.00	30.00 to 35.00	30.00 to 32.00
Kentucky	32.00 to 35.00	30.00 to 35.00	30.00 to 32.00
Illinois	32.00 to 35.00	30.00 to 35.00	28.00 to 32.00
Missouri	32.00 to 35.00		
Silica Brick			
Pennsylvania			30.00
Chicago		35.00 to	37.00
Birmingham			40.00
Magnesite Brick			
Standard size per net ton (f.o.b. Baltimore)			53.00
Grain magnesite per net ton (f.o.b. Baltimore)			28.00
Chrome Brick			
Standard size, per net ton		40.00 to	42.00

### APRIL INGOT OUTPUT

Yearly Rate Above 36,000,000 Tons, or 11 Per Cent More Than That of March

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in April of 2,439,246 gross tons as compared with 2,370,751 tons in March. Estimating the production of other companies on the basis of the 30 companies (though it is probable the small companies did not equal the rate of the larger ones), the total output of ingots in April was 2,896,966 tons, or 115,879 tons per day, counting 25 working days. The daily output in March averaged 104,282 tons per day, so that the April output averaged over 11 per cent better than that of March. This contrasts with a gain of over 20 per cent per day in March over February.

In the table below, the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	668,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,819
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,160	1,213,968
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total, 1921	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835*	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,992,198	445,939	1,109	2,439,246
Total, 4 mos.	6,567,412	1,577,747	3,342	8,148,501

\*Revised.

The April ingot production was at a yearly rate of 36,038,369 tons, counting 311 operating days to the year. This compares with a rate in March of 32,431,702 tons, in January of 23,542,500 tons, and with 11,857,186 tons in July, the low point for 1921.

The increase of 68,495 tons in April in the ingot output of all companies reporting contrasts with an increase of 36,194 tons in the April pig iron output over that of March.

## ACTIVE DEMAND FOR STEEL

### Youngstown Industries Busy with Prices Tending Upward

YOUNGSTOWN, May 9.—New demand for steel is in volume, with makers generally sold ahead for the rest of the quarter. Some spot business is commanding premiums from those interests in position to take on such tonnage. The principal independent maker of full finished sheets is still quoting 4.50c for No. 22 gage automobile body stock, but some tonnage is reported to have been taken at 4.65c.

Production in the Mahoning Valley averages 75 per cent in finished lines. April output of the Trumbull Steel Co. was one of the largest in a single month in the company's history and officials expect maintenance of this production rate through the Summer.

Shortage of steel is accountable for a slight let down in sheet mill operations, 88 mills being scheduled this week as compared with 93 the week before.

Increased manufacturing costs caused by the coal strike warrant higher prices, say makers. Heavy melting scrap, for instance, is up nearly \$5 per ton from prices current earlier in the year, when this grade averaged \$14 to \$14.50. Dealers have paid as high as \$18 in the past ten days, with an added charge to melters. Other grades of scrap are proportionately higher.

An interest in the Valley recently purchased a round-lot tonnage of basic pig iron at Birmingham, Ala., paying \$17.50. Freight charges to the Youngstown district made this iron cost in excess of \$24.

## COAL SITUATION

### Subject Will Be Discussed at Meeting of Chamber of Commerce of United States

WASHINGTON, May 9.—Two of the interesting topics to be discussed at the tenth annual meeting of the Chamber of Commerce of the United States to be held in Washington, May 15 to 18, include coal supplies and the extent to which the production of raw materials in the United States is dependent on business conditions in other countries.

One of the group meetings will be turned over to a thorough consideration of the coal situation, because of the increasing interest in this subject. The purpose is to bring together leaders in the coal industry and large industrial consumers in a discussion of some of the most important problems of the industry as they affect the producer and consumer. This discussion is to take place on May 16. An address on the subject of "The Coal Industry and Government Regulation" will be made by Senator Howard Sutherland of West Virginia. This address will be followed by a discussion of three pertinent phases of the coal business, including distribution, transportation, and labor. Major W. R. Coyle, Bethlehem, Pa., president of the American Wholesale Coal Association, will present his topic from the producers' viewpoint, stressing the necessity of the purchaser's knowing the quality of coal he is buying. This will be part of the discussion on distribution and the subject of Major Coyle's address will be "Better Selling Methods."

On the question of transportation, which enters so largely into the calculations of the coal consumer, E. M. Poston, of Columbus, Ohio, President of the New York Coal Co., will bring to the meeting an analysis of this phase of the industry. "The Strike and How to Prevent a Recurrence," is the title of an address to be given by Eugene McAuliffe, president Union Colliery Co., St. Louis.

The subject of natural resources will be taken up at a Special Group Session on May 17. In announcing the program for this group, the Chamber says:

"When we consider that in the year 1920 more than 53 per cent of the copper produced in the United States found a market in European countries, and in the same year more than 50 per cent of our cotton products

Prior to the strike, standard iron was purchasable from \$18 to \$19. The Birmingham purchase is the first iron to come to this district from the South in a number of years, Valley capacity taking care of steel makers' requirements.

On account of the shortage of iron, the first tendencies toward a break in the coal strike will be followed by resumption of a number of furnaces in the Valleys. Just before the strike began April 1, the Sharon Steel Hoop Co. and the Republic Iron & Steel Co. were preparing to put the blast on additional stacks. Meanwhile, the A. M. Byers Co. has suspended its Mattie blast furnace at Girard. It is in this direction that the strike is exerting its most pronounced effect.

Coal costs are likewise substantially higher. Range on gas and steam coal of good grade from the West Virginia and Kentucky fields is now \$2.75 to \$3 per ton, with an added freight charge of \$2.66 to Youngstown. This makes \$2.75 coal cost \$5.41 laid down at the steel plants. One independent which bought Kentucky coal in substantial amounts recently paid from \$2.60 to \$2.85 for various lots. These delivered prices represent an advance in excess of \$2 per ton for coal over costs on fuel shipped from nearby districts.

Considerable business in strips and sheets is coming regularly from the automobile industry. Hot strips range from 2c to 2.10c, while cold rolled strip steel is very firm at 3.65c.

Independent tinplate mills in this territory are operating at a rate close to normal. Heavy tonnages of tinplate are moving from the Trumbull Steel Co. to a large canning and packing interest in Pittsburgh.

were disposed of in the same countries, we can readily appreciate how pertinent this subject has become to the men in these two important industries. To no less a degree is the lumber industry affected, and it is not at all improbable that the solution for stabilizing the coal industry may rest on the European situation."

Sidney J. Jennings, vice-president of the United States Smelting & Refining Co., of New York will talk on copper. President George M. Dexter of Dexter & Carpenter Co., who recently returned from a study of coal conditions in Europe, will prepare a paper on coal.

### Rate Decision Not Referred to White House

WASHINGTON, May 9.—In denying irresponsible reports that the Interstate Commerce Commission has referred the matter of a decision in the general rate case to the President, it was stated emphatically this afternoon at the White House that the Commission has no authority to refer the matter to the President and that the latter has no authority to pass upon it. While there are many reports as to when the decision will come down, its probable character and related questions, it can be stated that they are entirely without authority.

It was also made known that the President will confer with 15 or 20 railroad executives at the White House on May 20 regarding a policy of rate making as it bears on the matter of carriers obtaining a 6 per cent net income.

### Weighing by Substitution

Technological paper No. 208, by C. A. Briggs and E. D. Gordon, describes a plan for making substitution weighings, applicable either to equal-arm balances or compound-lever scales, that has been developed in connection with the standardization of large weights at the Bureau of Standards. It has been prepared to meet a demand, for an explanation of substitution weighing, which has come from practical scale men in the field who have seen the plan in use by the representatives of the Bureau and who desire to adopt it. The description, however, will also be of interest and value to many workers in engineering and other laboratories who have occasion to weigh large objects accurately. A record form and computation sheet is presented which it will be found advantageous to follow.

## British Iron and Steel Market

Prices Easier with Home Business Stagnant—Fair  
Export Inquiry—Continental Quotations

Higher  
(By Cable)

LONDON, ENGLAND, May 9.

Shipbuilding labor disputes being settled, work has been resumed this week. The engineering labor dispute continues.

Pig iron generally is quiet. Home trade buying is practically stagnant, but export sales are maintained. America is buying Cleveland pig iron. Unless there is an early settlement of all industrial troubles, production probably will be curtailed shortly. Hematite is dull and unchanged.

Finished steel demand is increasing. India and Siam are inquiring here for fair tonnages of railroad material. Export prices generally are firm, though the works are badly in need of orders. Home trade is dull.

Swan, Hunter & Wigham Richardson, Ltd., Newcastle, has bought the North British Diesel engine works at Glasgow.

There is improved demand for Continental steel. China is buying German rails. India and China are also buying moderate quantities of bars, angles and structural beams. Continental prices are given in the table.

Tin plate is weak on forced realization sales by merchants and from a decrease in general buying. Forward sales are being done at 19%*s.* (\$4.30) basis f.o.b. There is a fair amount of export inquiry, though little actual business is being done. The Welsh output is at 70 to 75 per cent, but a reduced production is anticipated if quotations decline much further.

Galvanized sheets are weaker on decreased business. The Continent is buying black sheets, but some

makers are so desirous to get orders that quotations are easier.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.44 per £1, as follows:

Durham coke, delivered	£1 8s.			\$6.22
Cleveland No. 1 foundry	4 15			21.09
Cleveland No. 3 foundry	4 10			19.98
Cleveland No. 4 foundry	4 7½			19.42
Cleveland No. 4 forge	4 2½	to 4 5		18.31 to 18.87
Cleveland basic	4 10			19.98
East Coast mixed	4 15	to 4 17		21.09 to 21.53
Ferromanganese	15 0			66.60
Ferromanganese*	14 10	to 14 15		64.38 to 65.49
Rails, 60 lb. and up	7 17½	to 9 10		34.96 to 42.18
Billets	7 8	to 8 0		32.86 to 35.52
Sheet and tin plate bars,				
Welsh	7 7½			32.74
Tin plates, base box	0 19½	to 0 19½		4.30 to 4.36
				C. per Lb.
Ship plates	9 5	to 10 10		1.83 to 2.08
Boiler plates	13 10	to 14 0		2.68 to 2.77
Tees	9 10	to 11 0		1.88 to 2.18
Channels	8 15	to 10 5		1.73 to 2.03
Beams	8 10	to 10 0		1.68 to 1.98
Round bars, ¾ to 3 in.	10 10			2.08
Galvanized sheets, 24 g.	15 15	to 16 0		3.12 to 3.17
Black sheets	12 0	to 12 5		2.38 to 2.43
Steel hoops	12 0	& 12 5*		2.38 & 2.43*
Cold rolled steel strip,				
20 g.	23 10			4.66
Cotton ties, Indian specifications	15 0			2.97

\*Export price.

### Continental Prices, All F.O.B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:				
Belgium, May	£5 0s.			\$22.20
Luxemburg, May	5 0			22.20
France, May	5 10			24.42
Merchant bars:				C. per Lb.
Belgium, June, July	7 17½	to 8 0		1.56 to 1.59
Luxemb'g, June, July	8 7½	to 8 10		1.66 to 1.68
Germany, July, Aug.	8 0			1.59
France, June, July	8 10	to 8 15		1.68 to 1.73
Joists (beams):				
France, June, July	7 10	to 7 15		1.49 to 1.54
Belgium, May, June	7 12½			1.51
Luxemb'g, June, July	7 10	to 7 15		1.49 to 1.54
3/16-in. plates:				
Germany, May, June	9 5			1.83
Luxemb'g, June, July	8 5	to 8 15		1.63 to 1.73
Belgium, June, July	8 5	to 8 15		1.63 to 1.73
½-in. sheets:				
Belgium, May, June	9 10			1.88

## JAPANESE RAIL BUYING HEAVY

Government Railroads Close for Tonnage of 75-lb.

Rails and Issue New Tender for 60-lb. Rails

NEW YORK, May 9.—The most noteworthy features of the export market continue to be the purchases and inquiries by railroads in the Far East. The leading buyer is, at present, the Imperial Government Railways in Japan, which placed its recent tender for 10,800 tons of 75-lb. rails and accessories with the Mitsubishi Shoji Kaisha, New York, at a price said to have been better than \$48 per ton, c.i.f. Japanese port. Bids will close May 12 on an additional tonnage of 60-lb. rails, totaling 10,000 tons, with 500 tons of splice bars, for the Imperial Government Railways. Both this tonnage and the order which has been placed are for use at Kobe and Yokohama. Japanese branch houses in the United States look forward to fairly heavy buying of railroad material throughout the year, and judging by recent purchases of the Government railroads in Japan, there may be a repetition this year of the activity in the year following the armistice, when rail buying totaled about 80,000 tons. A municipal inquiry from the city of Osaka, which closed May 10, called for bids on about 10 miles of 70-lb., 90-lb. and 102-lb. grooved rails for the city tramways. The recent inquiry of the South Manchuria Railway Co. for a fair-sized tonnage of spikes, locknut washers and splice bars has not yet been placed. The 840 tons of bridge material for the Japanese Government was placed with Takata & Co., New York.

Award for the construction of an "unofficial" exhibit building for American products at the Brazilian Centennial Exposition, Rio de Janeiro, Brazil, has been made to Dwight P. Robinson & Co., New York. The building, which will be constructed of American mate-

rials as far as possible, is purely a commercial proposition and has no connection with the exhibition plans of the American Government.

### Hudson and Essex Companies Merge

Merger of the Hudson Motor Car Company and Essex Motors, both of which have been controlled by the same interests, has been effected through the organization, under the laws of Michigan, of a new corporation bearing the name of the former with an authorized capital of 1,200,000 shares of no par value common stock.

The company has sold 170,000 Hudson cars in the last twelve years and this year the schedule calls for the production of 24,000 Hudson and 25,000 Essex cars. President R. D. Chapin estimates the aggregate volume of business in 1922 at \$55,000,000, net earnings on which, after taxes and depreciation, should be \$5,000,000.

The Hudson Motor Car Company was formed in 1909 with an original capitalization of \$100,000.

### No Announcement as to Clairton Coke Plant

PITTSBURGH, May 9.—The Carnegie Steel Co. as yet has made no official announcement as to its plans in connection with the completion of its by-product plant at Clairton, Pa. The matter is under consideration, but whether the company will build the additions itself, as it is privileged to do under its original contract with H. Koppers, or have the work done by the H. Koppers Co., has not yet been determined. The original plans called for 24 batteries of 64 ovens each or 1536 ovens. The present plant consists of 768 ovens.

# Prices Finished Iron and Steel, f.o.b. Pittsburgh

## Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic...	\$0.36	Kansas City .....	\$0.815
Philadelphia, export...	0.265	Kansas City (pipe)...	0.77
Baltimore, domestic...	0.35	St. Paul .....	0.665
Baltimore, export .....	0.255	Omaha .....	0.815
New York, domestic...	0.38	Omaha (pipe) .....	0.77
New York, export.....	0.285	Denver .....	1.35
Boston, domestic .....	0.405	Denver (wire products)...	1.415
Boston, export .....	0.285	Pacific Coast .....	1.665
Buffalo .....	0.295	Pacific Coast, ship plates	1.335
Cleveland .....	0.24	Birmingham .....	0.765
Detroit .....	0.325	Memphis .....	0.43
Cincinnati .....	0.325	Jacksonville, all rail...	0.555
Indianapolis .....	0.345	Jacksonville, rail and	
Chicago .....	0.38	water .....	0.46
St. Louis .....	0.475	New Orleans .....	0.57

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

## Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zeos, structural sizes, 1.50c. to 1.70c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.70c.

## Wire Products

Wire nails, \$2.40 to \$2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.25; galvanized wire, \$2.75; galvanized barbed wire, \$3.05 to \$3.15; galvanized fence staples, \$3.05 to \$3.15; painted barbed wire, \$2.55 to \$2.65; polished fence staples, \$2.55 to \$2.65; cement-coated nails, per count keg, \$1.90 to \$2; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 70½ per cent off list for carload lots; 69½ per cent for 1000-rod lots, and 68½ per cent for small lots, f.o.b. Pittsburgh.

## Bolts and Nuts

Machine bolts, small, rolled threads, 65, 10, 10 and 5 per cent off list  
Machine bolts, small, cut threads, 65, 10 and 5 per cent off list  
Machine bolts, larger and longer, 65, 10 and 5 per cent off list  
Carriage bolts, ¾ x 6 in.:  
Smaller and shorter, rolled threads, 65, 10 and 5 per cent off list

Cut threads 65, 10 and 5 per cent off list  
Longer and larger sizes, 65 and 5 per cent off list  
Lag bolts 65, 10 and 10 per cent off list  
Plow bolts, Nos. 1, 2 and 3 heads, 60 and 10 to 60 per cent off list

Other style heads, 20 per cent extra

Machine bolts, c.p.c. and t. nuts, ¾ x 4 in.:  
Smaller and shorter, 65 per cent off list  
Larger and longer sizes, 65 per cent off list  
Hot pressed square or hex. blank nuts, \$5.25 off list  
Hot pressed nuts, tapped, \$5.25 off list  
C.p.c. and t. sq. or hex. nuts, blank, \$5.00 off list  
C.p.c. and t. sq. or hex. nuts, tapped, \$5.00 off list  
Semi-finished hex. nuts:  
9/16 in. and smaller, U. S. S. . . . 80, 10 and 10 per cent off list  
Small sizes, S. A. E., 80 and 3 tens to 80 and 2 tens per cent off list

¾ in. to 2 in. inclusive, U. S. S. . . . 80 per cent off list  
Stove bolts in packages, 80, 10, 10 and 5 per cent off list  
Stove bolts in bulk, 80, 10, 10, 5 and 2½ per cent off list  
Tire bolts 65, 10 and 5 per cent off list  
Track bolts in carloads, 3c. base  
Track bolts, less than 200 kegs, 3.50c. base

## Upset Square and Hex. Head Cap Screws

¾ in. and under, 80 and 10 to 80, 10 and 10 per cent off list  
9/16 in. to ¾ in., 80 and 10 to 80, 10 and 10 per cent off list

## Upset Set Screws

¾ in. and under, 80, 10 and 5 to 85 per cent off list  
9/16 in. to ¾ in., 80, 10 and 5 to 85 per cent off list

## Milled Square and Hex. Cap Screws

All sizes, 75 and 10 to 80 per cent off list

## Milled Set Screws

All sizes, 70, 10 and 10 per cent off list

## Rivets

Large structural and ship rivets, \$2.25  
Large boiler rivets, 2.35  
Small rivets, 70 and 10 to 75 and 5 off list

## Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$38; chain rods, \$38; screw stock rods, \$43; rivet and bolt rods and other rods of that character, \$38; high carbon rods, \$45 to \$48, depending on carbons.

## Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. and larger, \$2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ¾-in. and 7/16-in., \$2.50 base; 5/16-in., \$2.50 base. Boat and barge spikes, \$2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, \$3 base per 100 lb. in carload lots. Tie plates, \$1.75 per 100 lb. Angle bars, \$2.40 per 100 lb.

## Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.30 per package; 8-lb. coating, I. C., \$9.60; 15-lb. coating, I. C., \$11.80; 20-lb. coating, I. C., \$13; 25-lb. coating, I. C., \$14.25; 30-lb. coating, I. C., \$15.25; 35-lb. coating, I. C., \$16.25; 40-lb. coating, I. C., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

## Iron and Steel Bars

Steel bars, 1.50c. to 1.70c. from mill. Refined bar iron, 2c. to 2.10c.

## Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
¼ to ¾	54½	28	¼ to ¾	3½	+22½
¾ to 1	60	33½	¾ to 1	36½	18½
1 to 1½	65	50½	1 to 1½	42½	27½
1½ to 2	69	56½	1½ to 2	44½	29½
2 to 3	71	58½			

Lap Weld			Lap Weld		
Inches	Black	Galv.	Inches	Black	Galv.
2 to 6	64	51½	2 to 6	39½	25½
6 to 8	68	55½	6 to 8	42½	29½
8 to 12	65	51½	8 to 12	40½	27½
12 to 18	64	50½			

Butt Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
¼ to ¾	50½	33	¼ to ¾	4½	+27½
¾ to 1	56	38½	¾ to 1	36½	23½
1 to 1½	62	50½	1 to 1½	42½	28½
1½ to 2	67	55½	1½ to 2	44½	30½
2 to 3	69	57½			
3 to 4	70	58½			

Lap Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
2 to 4	62	50½	2 to 4	40½	27½
4 to 6	66	54½	4 to 6	43½	31½
6 to 8	65	53½	6 to 8	42½	30½
8 to 12	61	47½	8 to 12	35½	23½
12 to 18	55	41½	12 to 18	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

## Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		Charcoal Iron	
Inches	Discount	Inches	Discount
1½ in.	26½	1½ in.	5
2 to 2½ in.	41	2 to 2½ in.	15
2½ to 3 in.	52	2½ to 3 in.	25
3 to 3½ in.	57	3 to 3½ in.	30
		3½ to 4 in.	32

To large buyers of steel tubes, a supplementary discount of 5 per cent is allowed.

## Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

Inches	Discount	Inches	Discount
1 in.	63	2½ and 2¾ in.	46
1½ and 1¾ in.	55	3 in.	50
1¾ in.	36	3½ to 4 in.	55
2 and 2½ in.	42	4½ in. to 5 in.	47

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed		Cents per Lb.	
No.	Price	No.	Price
No. 8 and heavier	2.35	Nos. 13 and 14	2.50
Nos. 9 and 10 (base)	2.40	Nos. 15 and 16	2.60
Nos. 11 and 12	2.45		

## Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
No.	Price	No.	Price
Nos. 17 to 21	2.95	No. 28 (base)	3.15
Nos. 22 to 24	3.00	No. 29	3.25
Nos. 25 and 26	3.05	No. 30	3.35
No. 27	3.10		

## Galvanized

Cents per Lb.		Cents per Lb.	
No.	Price	No.	Price
Nos. 10 and 11	3.15	Nos. 25 and 26	3.35
Nos. 12 to 14	3.25	No. 27	4.00
Nos. 15 and 16	3.40	No. 28 (base)	4.15
Nos. 17 to 21	3.55	No. 29	4.40
Nos. 22 to 24	3.70	No. 30	4.65

## Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
No.	Price	No.	Price
Nos. 15 and 16	2.95	No. 28 (base)	3.15
Nos. 17 to 21	3.00	No. 29	3.20
Nos. 22 to 24	3.05	No. 30	3.20
Nos. 25 to 27	3.10	Nos. 30½ and 31	3.25

## STRIKE UNCERTAINTIES

### Positive Developments Still Lacking—Hope That Worst Has Been Passed

PITTSBURGH, PA., May 9.—The coal strike situation is on dead center. The story, as unfolded by loadings of coal by the railroads tapping the western Pennsylvania fields, is that there has been no definite tendency one way or the other. A daily average of close to 1800 cars is being maintained, or approximately 22 per cent of the average daily loadings in the territory embraced. Coke production in the Connellsville district showed a smaller decline in the final week of April than in any of the preceding three weeks. Production for the week ended April 29 was 54,230 tons. This was a drop of 10,750 tons compared with the previous week. Output of the latter week was 33,830 tons below that of the week before, while in the week ending April 15 the ovens turned out 35,610 tons less than in the week ended April 8. Hope that the worst has been seen is encouraged by the relatively small loss of the final week of April, but there are no positive claims yet that the week ended May 6 will show a change from the downward trend of production. If this week shows as well as the previous week, the most hopeful expectations will have been realized.

Bringing in of coal from distant Southern fields has made the position of steel makers slightly more comfortable, though we note the suspension of another steel works blast furnace, that of the Pittsburgh Steel Co. at Monessen, Pa. On the other hand, the Carnegie Steel Co. to-night will start up two of the four blast furnaces at its Mingo, Ohio, works.

The effect of the sympathetic strike of miners and coke oven workmen in the Connellsville district in the first month of the defection is clearly pictured in the statistics of the most recent issue of the Connellsville *Courier*, covering conditions as of April 29 last. Loss in production of coke in the four weeks has been progressive and that for the week ended April 29 was 95,730 tons less than in the week immediately prior to the walkout. This is a decline of approximately 64 per cent. Only 25 coking plants, embracing 4868 ovens, were active at the end of April, as compared with 62 plants having 11,964 ovens which were in production at the end of March. The week's production of 54,230 tons is the smallest of any previous week since October last year, when the output for the first week of that month was 53,200 tons, and for the second week 56,640 tons.

### Last Week's Developments

UNIONTOWN, Pa., May 6.—THE IRON AGE correspondent believes that the peak of the sympathetic coal strike in the Connellsville bituminous region has been passed. The union again has failed to capture the Connellsville region.

Your correspondent does not mean, by this, that normal production in the region is to be attained immediately. That is not the case. Normal production will not be reported in the region within 30 days unless there is a sudden break and return to the mines en masse. Conservatively speaking, your correspondent believes that the strike issue here will be a thing of the past by 60 days and forgotten by another 30 days.

The union organizers, headed by William Feeney, et al., carried the southern Connellsville region and made inroads in the northern Connellsville field until they struck the Leisenring territory. There they stopped after suspending operations at the Leisenring No. 1 plant. Since the No. 1 Leisenring plant went out a fortnight ago, the union has failed to make further progress. In fact, it has slipped back. Each succeeding day brings an increase in production in the region—small, to be sure, but no less pronounced and

no less steady. The railroad shipments show this without cavil.

The union leaders by their actions, addresses and silence admit failure to carry their day. Feeney apparently felt things slipping and brought Van Bitner into the region. It is true that some of the meetings were very largely attended. During the past week, the union leaders have played their trump card with the announcement that John L. Lewis, "himself," will visit the Fayette county region for a series of meetings. These meetings and those held during the past fortnight have been nothing more than an effort to instil enthusiasm and backbone in the wavering ranks of the strikers.

The union leaders are devoting most of their addresses to attacks upon the newspapers in the county.

A compromise with the sheriff and State police after an order had been issued forbidding all mass meetings of miners took some of the pep out of the addresses at previous meetings. There is permitted no touch of radicalism; the union leaders must counsel and demand that their men obey the law and refrain from disorder. That conference was held at Brownsville on Monday and immediately afterwards a meeting was held at Merrittstown, followed by another at Connellsville on the following day. Sheriff Shaw, after the conference, announced that charges that deputies were misusing their authority would be investigated and acted upon.

Several deputies have been arrested during the week on charges of assault and battery. Informations have been made against a number of strikers on assault and battery. At one plant near Uniontown snipers have persisted in shooting out arc lights placed about the company property.

### Some Strikers Return — Violence at Several Places

UNIONTOWN, PA., May 9.—Forty-six strikers involved in the Tower Hill rioting were held for court under \$2,000 bail each at preliminary hearings held here yesterday. So far none of the defendants has given bail. Six others arrested after the riot were discharged. The hearings involved statements of the case by the State police and deputies and identification of the prisoners as having taken part in the outbreak. They probably will be tried at the June term of court on charges of aggravated riot and aggravated assault and battery.

Employees of the Calumet mine of the H. C. Frick Coke Co. went back to work yesterday after a conference between company officials and workers. The workers said they were tired of the strike and went back to work en masse.

The stable of the Warwick Coal Co., near Fredericktown, was dynamited this morning. One horse was killed and a number of others maimed. Bloodhounds were put on the trail. Officers yesterday broke up a meeting of miners at Footedale when it was declared that there was a large number of intoxicated men present, and addresses were a trifle more radical than permitted under a recent agreement between leaders and officers. When a crowd of more than 100 women congregated during eviction proceedings at Leckrone yesterday, officers were called to disperse them. One man was arrested charged with urging women to attack the officers.

A number of eviction warrants have been executed at various plants in the county during the past week. But it is understood that these have been issued against those most actively involved in the strike agitation.

### Would Hold Union Responsible

The Northern West Virginia Coal Operators' Association, at a meeting in Fairmont, W. Va., May 3, petitioned Congress by resolutions asking that national legislation be passed to make the United Mine Workers of America, as an organization, financially responsible, so that the operators may be protected against loss of life, property and business and enforced idleness.

## NON-FERROUS METALS

### The Week's Prices

Cents Per Pound for Early Delivery							
	Copper, New York	Straits	Lead			Zinc	
	Lake	Electro-lytic*	Tin New York	New York	St. Louis	New York	St. Louis
May 11	13.00	12.75	30.75	5.35	5.20	5.37½	5.02½
10	13.00	12.75	30.75	5.35	5.20	5.35	5.00
9	13.00	12.75	30.75	5.35	5.20	5.35	5.00
8	13.00	12.75	30.75	5.35	5.20	5.35	5.00
7	13.00	12.75	30.62½	5.35	5.17½	5.35	5.00
6	13.00	12.75	30.62½	5.35	5.15	5.35	5.00

\*Refinery quotation.

### New York

NEW YORK, May 9.

Most of the markets are fairly active and strong. Demand for copper is increasing and prices are advancing. The tin market has been moderate with prices steady. Activity in the lead market has diminished and prices are slightly easier. There is no improvement in the zinc market and prices are practically unchanged.

**Copper.**—Both domestic and foreign demand for copper has increased quite sharply and sales have been fairly large for both deliveries. There has been a complete elimination of sellers below 13c., delivered, and with one or two exceptions the market for electrolytic copper is on a basis of 13.12½c., delivered, or 12.87½c., refinery. The amount available at 13c., delivered, is evidently growing smaller each day, with the expectation that 13.12½c., delivered, will soon be the minimum. Consumers of copper report a steady demand for their product and are entering the market more freely. Sales since the middle of last week have been fairly large.

**Tin.**—On Thursday, May 4, fairly large sales of Straits tin were made, the estimated total running from 600 to 700 tons. Consumers were the principal buyers, taking at least four-fifths of the total and perhaps more, and the deliveries were mostly early shipments from the East, with some far future deliveries included. The lowest sales were at 30.62½c., with the highest at 30.87½c. in the afternoon. All the regular importers shared in the business. On the previous day, Wednesday, moderate sales were made amounting to 200 to 250 tons at 30.75c., ex-steamer, and at 30.87½c. to 31c. for June-July shipment. Other days of the week were dull and featureless and the fact that on Friday, following these two active days, there was no sharp rise in London was a disappointment. Yesterday and to-day the market has been quiet. Yesterday, May 8, there were a few sales reported, possibly 100 to 150 tons, or enough to make a market at 30.75c. and later in the day at 30.62½c., with more sellers than buyers at the latter figure at the close of the day. Spot Straits tin to-day was quoted at 30.62½c., New York, and the London market was down about £4 per ton from a week ago, with spot standard at £148 15s.; future standard, £150 5s. and spot Straits, £151. Arrivals thus far this month have been 815, with the total afloat reported at 6055 tons.

**Lead.**—The market is generally quiet, although there are reports from some quarters of good business having been done. The St. Louis market has eased off slightly, and some business has been done at 5.17½c. with 5.15c. heard of but not confirmed. The market in New York is irregular, with the leading interest taking some orders at 5.25c. and independents selling at 5.35c., with some spot sales heard of at 5.45c. and higher. Carload lots have changed hands at 5.50c. to 5.60c., New York. Buyers generally are waiting for a recession.

**Zinc.**—The market is exceedingly quiet and prime Western for early or May delivery is generally quoted at a range of 5c. to 5.05c., St. Louis, or 5.35c. to 5.40c., New York. There has not been a large amount of busi-

ness to actually test the market, but it is probable that desirable specifications could be placed at 5c., St. Louis, or 5.35c., New York. High-grade zinc is reported to have sold as high as 6c. in this market.

**Antimony.**—Wholesale lots for early delivery are quoted at 5.37½c. to 5.50c., New York, duty paid.

**Aluminum.**—Wholesale lots of virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, are quoted by the leading interest at 19c. to 19.10c., f.o.b. plant, with importers offering the same grade at around 17.50c. to 18c., New York, duty paid.

**Old Metals.**—Business is active and values are advancing. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	12.75
Copper, heavy and wire.....	11.75
Copper, light and bottoms.....	9.75
Heavy machine composition.....	9.75
Brass, heavy .....	7.00
Brass, light .....	5.75
No. 1 red brass or composition turnings.....	8.25
No. 1 yellow rod brass turnings.....	6.50
Lead, heavy .....	4.50
Lead, tea .....	3.25
Zinc .....	3.00

### Chicago

MAY 9.—Demand has shown a further subsidence and the price of lead has declined. Both lead and zinc have been regarded as unduly high by buyers with the result that they have been staying out of the market. A fair volume of tin has changed hands locally but this metal has declined because of conditions in the East and abroad. Copper appears to be slightly stronger. Old metal prices remain unchanged except for a decline in zinc. We quote in carload lots: Lake copper, 13.25c. to 13.50c.; tin, 32.50c.; lead, 5.25c.; spelter, 5.15c.; antimony, 7.25c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 8c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 4c.; zinc, 2.50c. pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 25c.; all buying prices for less than carload lots.

### Reconstruction of Belgian Steel Works

The *Moniteur des Intérêts Matériels*, in the first of a series of articles on the position in the largest Belgian iron and steel works, describes the Société d'Ougrée-Marihay, which in 1914 possessed eight blast furnaces with a production of 36,000 tons of Thomas iron per month. At the time of the armistice four of these had been entirely destroyed and the other four partially destroyed. Four blast furnaces have now been entirely rebuilt, and have a normal production of 18,000 tons per month. Before the war the four converters at the steel works produced 50,000 tons of ingots per month, but were all more or less destroyed. They are now again capable of producing the pre-war quantity. Three open-hearth steel furnaces, which were not destroyed and produced 5800 tons before the war, have increased the production to 8000 tons. The electric steel works are producing at the same rate as before the war, that is to say, 600 tons per month. Of the 12 rolling mills in existence in 1914—all of which were destroyed—eight have been rebuilt, and are producing at approximately pre-war rates. The coking furnaces, which were partially destroyed, have also reached their pre-war production of 16,000 tons per month.

A newspaper report says "a huge deposit of high-grade iron ore, believed by mining experts to be one of the most valuable ever located in Northern Minnesota, has been discovered on the Cuyuna range near Crosby, Minn." The facts are that two drill holes are in ore, cross-sectioning the deposit and nothing is known of the length. One of these holes gave more than 300 ft. of good ore. The property is on the Kennedy ground, leased to the Rogers-Brown Ore Co., in which the Steel & Tube Co. of America has more than a 50 per cent interest. Nothing can be said as to tonnage. The discovery was made last year.

## PERSONAL

L. H. Miller recently severed his connection with the Cleveland office of the Bethlehem Steel Co., to become managing director of the newly organized National Steel Fabricators' Association, the object of which is the establishment of standards for the guidance of steel fabricators with the view of bringing about uniformity in steel building construction and the conserving of steel used for this purpose. Mr. Miller graduated from the University of Toronto in 1900 and during the following eight years was associated with the engineering departments of the Brown Hoisting Machinery Co., Wellman-Seaver-Morgan Co., and the McMyler Interstate Co., Cleveland. In 1908 he became connected with the Bethlehem Steel Co., as a structural steel sales agent in the Cleveland territory and in 1916 when the Bethlehem company took over the Pennsylvania Steel Co., and organized the Bethlehem Steel Bridge Corporation, he was made sales engineer of the Bridge corporation. He is an associate member of the American Society of Civil Engineers.



L. H. MILLER

Lennart von Friesen, chief engineer of the Swedish Iron Masters Association (the Jern Kontoret) of Sweden, attended the recent spring meeting of the American Electrochemical Society at Baltimore, Md., and is to spend several weeks in this country.

R. A. Flum has been appointed general factory manager of the C. G. Spring Co., Kalamazoo, Mich. He held a similar position years ago with the Perfection Spring Co., Cleveland, and comes to Kalamazoo to again be associated with his old chief, Christian Girl.

W. M. Sheets, formerly of the Miami Cycle Works, has just been made sales manager of the Lomar Manufacturing Co., Middletown, Ohio.

William T. Bennett, for the past four and one-half years associated with Alley & Page, Boston, pig iron, has resigned to engage in the coal business.

Franklin S. Jerome has been elected president Seymour Mfg. Co., Seymour, Conn., metal goods, and Clayton S. Boise, treasurer, to succeed the late George E. Matthies, who was both president and treasurer.

S. F. Bowser, founder and president S. F. Bowser & Co., manufacturer of oil and gasoline tanks and pumps and other allied products, including a system of oil filtration, with home plant at Fort Wayne, Ind., and other plants at Milwaukee and Toronto, Ont., has retired from the presidency of the company to become chairman of the board. He is succeeded as president by S. B. Bechtel, since 1920, vice-president and general manager.

P. W. Bowers has severed his connection with the Perry-Buxton-Doane Co., Boston and Philadelphia, to open a general brokerage business in scrap iron and steel at Lancaster, Pa.

H. D. Scott, assistant superintendent Yorkville, Ohio, Works, Wheeling Steel Corporation, has been promoted to the position of superintendent to fill the vacancy caused by the resignation of E. T. McNulty, who has become affiliated with the Charcoal Iron Products Co., Washington, Pa., as general manager.

George T. Fonda, who had been associated with the Bethlehem Steel Co. since his graduation from Stevens

Institute of Technology in 1909 and who in 1917 became general supervisor of safety, employment and general welfare work for that company, resigned recently to become manager of the labor and safety division of the Columbia Salvage Corporation, New York. Mr. Fonda will make his headquarters in Washington and will have charge of all matters pertaining to safety, labor, compensation, etc., for that company, which is carrying on salvage work for the War Department. He is a mechanical engineer and held the position of assistant to the master mechanic, Bethlehem, Pa., prior to his appointment in 1913 as safety engineer. This was a new department and it fell to Mr. Fonda to organize and develop it. His success may be measured by his promotion in 1917 to the position of supervisor safety and industrial relations work in all of the steel plants of the Bethlehem company. He has been a director of the National Safety Council since 1915, and was a member of the executive committee as well as chairman of the iron and steel section from 1916 to 1917.

Louis T. Lott who has been associated with the Weirton Steel Co., Weirton, W. Va., has severed that connection to join the sales force of the American Steel Co., Pittsburgh.

R. M. Barwise, who has for the past twelve years been the Eastern representative of the Diamond Chain & Mfg. Co., will open an office and store room at 18 Hudson Street, New York, about May 20 for the distribution of Diamond block and roller chains, custom made sprockets, Philadelphia Gear Works standard stock gears and sprockets, custom made spur, bevel and worm gears and gear housings.

Dr. Tobias Dantzig, engineer S.K.F. Industries, Inc., was schedule to deliver a paper on "Ball and Roller Bearings, Their Design, Construction and Application" before a meeting at the rooms of the Providence Engineering Society on Tuesday evening, May 9.

W. H. Wallace has been appointed sales manager of the Perfection Spring Co., Cleveland, to succeed H. E. Figgie who is leaving the organization. Mr. Wallace has been with the company for some years in the capacity of sales engineer.

Harry W. Bliven has been elected vice-president of Harvey Hubbell, Inc., Bridgeport, Conn. For more than 20 years Mr. Bliven has been general sales manager of the company, and as vice-president is to continue in charge of sales. His earlier experience in the electrical field comprised eight years as salesman with the Western Electric Co.

L. S. Love, formerly vice-president and general manager of Barbour, Love and Woodward, New York, has resigned from that company.

A. Clohosey, purchasing agent of the Westinghouse Lamp Co., Bloomfield, N. J., was recently named by the nominating committee of the National Association of Purchasing Agents as a candidate for the presidency of that association. The elective office will be filled at the convention of the National Association of Purchasing Agents in Rochester on May 19.

R. M. Rice has resigned as purchasing agent, La Belle Iron Works, Steubenville, Ohio. His successor has not been announced. Mr. Rice will go into business for himself in Wheeling, W. Va.

G. M. Sherman, formerly representing the Quigley Furnace Specialties Co., has become New England sales manager of the Keystone Refractories Co., New York, with offices at 818 Hospital Trust Building, Providence, R. I.

F. N. Satter, member of the sales staff of the Electric Alloy Steel Co., Youngstown, Ohio, has been transferred to the Pittsburgh district office, effective May 15. He originally went to the Youngstown district from Pittsburgh as an inspector of war materials for the French government, and was subsequently identified with the Newton Steel Co. in the inspection department.

Several changes in the personnel of the subsidiaries of the Wheeling Steel Corporation were made at a

recent meeting of the board of directors. D. Allen Burt, who besides being vice-president and treasurer of the Wheeling Steel Corporation, has been president of LaBelle Iron Works, has become chairman of that company and is succeeded as president by A. J. McFarland, who a few months ago was made general manager of this company. W. W. Holloway has been made president, the Whitaker-Glessner Co., succeeding Andrew Glass, who has held that position besides that of vice-president in charge of operations, the Wheeling Steel Corporation. George W. Moore, general manager, Portsmouth, Ohio, works, Whitaker-Glessner Co., has been named vice-president of the company.

G. C. Shidle has resigned, effective May 15, as assistant Pittsburgh district sales manager, Wheeling Steel Products Co., to become identified with the Thomas R. Heyward Co., Bowman building, Pittsburgh. Mr. Shidle in 1913 opened and took charge of the Pittsburgh office of LaBelle Iron Works, Steubenville, Ohio, and remained as Pittsburgh district sales manager of that company until its merger with the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co. into the Wheeling Steel Corporation about two years ago, and the formation of the Wheeling Steel Products Co., the sales subsidiary of the combination, which resulted in the consolidation of the district sales offices of the constituent companies. Prior to going with LaBelle Iron Works, Mr. Shidle was with E. W. Mudge & Co., Pittsburgh, for several years.

John N. Allen, who resigned as manager of the mining and transportation department, Brier Hill Steel Co., Youngstown, Ohio, in 1919, to become vice-president, National Sales & Trading Co., Cleveland, has been appointed purchasing agent, Donner Steel Co., Buffalo, succeeding E. L. Hendrickson. Prior to going with the Brier Hill Steel Co., Mr. Allen for a number of years had been with the Lackawanna Steel Co., Buffalo.

Paul Starrett has resigned as president of the George A. Fuller Co. and has been succeeded by James Baird, who has been the vice-president and manager of the company's Washington office.

Harrison P. Reed, electrical engineer, has been appointed general manager of the A. Kieckhefer Elevator Co., Milwaukee, manufacturer of electric freight and passenger elevators. Mr. Reed was graduated from Cornell University and for many years was associated with the Cutler-Hammer Mfg. Co., Milwaukee and New York, recently as head of the elevator control department.

Charles F. Jackson, for the past four years connected with the mining engineering department of M. A. Hanna & Co., Cleveland, is now associated with Crowell & Murray, Cleveland, as mining engineer. Mr. Jackson is widely experienced in the examination, exploration, development and operation of iron ore, anthracite and bituminous coal, copper and precious metal mines.

Robert J. Close, Duluth, Minn., has been appointed general superintendent Superior Shipbuilding Co., Superior, Wis., member of the American Shipbuilding Co. group. He succeeds Herbert Mosher, who was transferred Jan. 1 to Milwaukee as superintendent of the local unit.

### Thanks His Co-Workers

ST. LOUIS, May 9—"Dear Co-Worker," writes Clarence H. Howard, President of the Commonwealth Steel Co., to the workers in the organization, in a letter detailing the contents of the April-May issue of the *Commonwealth*, the company paper. The first two paragraphs of Mr. Howard's letter follow:

This letter is an expression of gratitude. First, because we have been able to increase our output and thus provide more and steadier work for the Commonwealth Family; and also because of the fine team-work and pep throughout the organization, which promises most gratifying results for us all.

The mutual understanding among us, and the appreciation of each other's problems and viewpoints through the "Commonwealth Plan—Equal opportunity for all," is better than at any previous time in the history of the company.

## OBITUARY

WILLIAM R. DAWSON, district sales manager American Chain Co., Inc., Pittsburgh, died on May 4, at his home in Pittsburgh. Born in Warren, Ohio, Dec. 21, 1852, he became identified early in life with the chain industry, and for the past 50 years has been actively interested in it. At an early age he joined the forces of the Hayden & Kay Co. of Chicago and was in their employ and in that of their successor, the P. Hayden Saddlery Hardware Co., until the formation of the Standard Chain Co., with which company he continued. When the Standard Chain Co. was absorbed by the American Chain Co., Inc., he became head of the welded sales and later was transferred to Pittsburgh as district sales manager. His long service and untiring activity gained for him the name of "dean of the chain industry."

JOHN SHARPLESS WORTH, chairman Worth Steel Co., Claymont, Del., died at his home in Coatesville, Pa., May 4, aged 71. Mr. Worth was born at Elkton, Md., and when he was only three years old went with his parents to Coatesville, where his father engaged in the iron and steel business. After attending an academy at Coatesville he went to Swarthmore College, but before completing his course went into the steel business of his father. He soon attained distinction as a designer of plate mills and most of the important equipment of the Worth plant was the product of his inventive genius. The business of the father became the Worth Brothers Co. in 1881, and John Sharpless was made president and his brother, W. P. Worth, secretary and treasurer. In 1915 the capital stock of the company was acquired by the Midvale Steel & Ordnance Co. Later the Worth Steel Co. was organized with John Sharpless Worth as chairman and W. P. Worth as president, and in May, 1917, began the building of a plate mill at Claymont, which was finished in due time. Mr. Worth was of a retiring disposition and not widely known, but was very popular with the employees of the mill and others with whom he came in contact.

JOHN HENRY PATTERSON, founder and chairman of the board of directors of the National Cash Register Co., Dayton, Ohio, died May 7. Mr. Patterson was born in 1844, but it was not until 1882 that he became interested in the use of cash registers and shortly afterward purchased an interest in the National Manufacturing Co., which was producing these machines. In 1884 he secured the controlling interest in this concern and incorporated the National Cash Register Co. As soon as his business was on a successful basis he became interested in industrial welfare work and was always prominent in that activity. At the time of the Dayton flood his resources were generously distributed to alleviate suffering and in all he contributed more than \$500,000 towards reconstruction work. He is survived by a daughter and by a son, Frederick B. Patterson, who is secretary of the National Cash Register Co.

SILAS HOWE, president the Wm. D. Gibson Co., manufacturer of springs, Chicago, died April 4, having served as president of the company since 1893. He was born at Millersburg, Ohio County, Ind., on June 5, 1837, and had resided in Chicago since 1887, at which date he became connected with the firm.

IRA H. BAKER, who had been prominently identified with sales of various lines of machinery equipment in Cleveland for a number of years, died May 2, age 41 years. He was the president of the Baker-Dunbar-Allen Co., which at present represents the Kerr Turbine Co. and other manufacturers.

SAMUEL L. MINER, one of the founders and for many years a director of the John B. Morris Foundry Co. and the Morris Machine Tool Co., Cincinnati, died at his home in that city on May 3. Mr. Miner was 82 years old and is survived by a daughter and a son, Charles L. Miner, well known pig iron salesman.

## WHEELING STEEL CORPORATION

### Annual Report Shows Heavy Loss Due to Limited Operations

The Wheeling Steel Corporation, in common with almost all other steel companies, lost money in 1921. The company had a net operating profit of \$1,514,806, but this was entirely swallowed up in the expense of plant idleness, which amounted to \$1,838,137. The surplus of the company, which on Dec. 31, 1920, stood at \$13,425,159, was reduced to \$6,881,653 as of Dec. 31, 1921. Reductions from the surplus, in addition to the net loss for the year, included an item of \$1,504,336 for the adjustment of Federal taxes in prior years.

Production of ore during 1921 was 337,092 tons, a decrease of 14,424 tons as compared with 1920; coal production aggregated 410,055 net tons against 982,105 tons in 1920, while the production of coke amounted to 109,118 net tons of by-product coke as against 334,094 tons of by-product and 10,910 tons of beehive oven coke in 1920. Pig iron production in 1921 amounted to 136,290 gross tons, against 567,588 in 1920; production of billets and slabs 226,710 gross tons against 726,722 tons in 1920 and of semi-finished and finished products 480,763 gross tons, contrasted with 1,066,912 tons in 1920. The volume of business done by all companies, including inter-company shipments, reached a value of \$28,300,995, a decrease of 72 per cent from the previous year, which showed shipments valued at \$99,822,888.

The earnings statement follows:

Income Account and Statement of Surplus for Year Ending Dec. 31, 1921	
Earnings from operations after deducting charges for maintenance and repairs of plants of approximately \$1,900,000	\$1,514,806
Add: Other Income	814,921
Total profits for the year	\$2,329,728
Deduct:	
Idle plant expense	\$1,838,137
Provision for general depreciation	2,293,911
Provision for exhaustion of minerals and extinguishment of lease values	414,408
Interest on bonds	395,896
Proportion of bond discount	7,475
	5,124,581
Net loss for the year	\$2,794,853
Surplus	
Surplus at Jan. 1, 1921	\$13,425,159
Add: Miscellaneous contingent reserves transferred to surplus	209,907
	\$13,635,066
Deduct:	
Adjustment of Federal taxes for prior years	\$1,504,337
Net loss for the year as above	2,794,853
	4,299,190
	\$9,335,877
Deduct dividends:	
On preferred A stock, 7 per cent.	\$76,982
On preferred B stock, 8½ per cent.	1,967,275
On common stock, 1 per cent.	388,101
On stock of subsidiary companies not held by Wheeling Steel Corporation	21,866
	2,454,224
Surplus carried to balance sheet	\$6,881,653

In his statement to the stockholders, Alexander Glass, chairman, says:

"The decrease in the demand for steel products, to which reference was made in the annual report for the year 1920, continued throughout 1921 with only a slight improvement during the early fall, with the result that the shipments for the year were only 28 per cent of the value and about 45 per cent of the quantity shipped in 1920.

"The marked reductions in the selling prices of all products during the year, together with irregular operations brought about conditions under which heavy losses from operations could not be avoided, despite the fact that wages and salaries were reduced and other economies effected which substantially decreased the operating costs.

"The shrinkage in the value of inventories resulted in still heavier losses. These losses amounting to \$4,172,864 were charged to a reserve account which was created when inventory values were greatly inflated during the war period."

## BRITISH FOREIGN TRADE

### Large Expansion in Steel Exports in March — Imports Still Declining

The March official returns of British foreign trade in steel and iron show that the total exports were 311,654 gross tons which contrasts with 228,370 in February and 261,119 tons in January. The March record is the largest since July, 1920, when the exports were 393,016 tons. In March, 1921, the total was 149,847 tons. These data include scrap. The March imports were 70,161 tons, the smallest in many months. It is necessary to go back to April, 1920, to find import figures approaching these; in that month they were 71,161 tons. In March, 1921, the imports were 179,610. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
January, 1922	261,119	100,178
February, 1922	228,370	77,270
March, 1922	311,654	70,161
Average per month, 1919	188,519	50,801
Average per month, 1920	274,881	128,685
Average per month, 1921	144,885	152,734
Average per month, 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data:

Principal British Exports, Gross Tons

	Average per Month		March	
	1913	1921	1921	1922
Pig iron	78,771	8,602	6,572	36,455
Steel rails	41,676	14,698	11,326	40,842
Steel plates	11,162	10,673	24,844	5,815
Galvanized sheets	63,506	17,635	6,497	49,945
Steel bars	20,921	8,927	9,001	15,961
Tin plates	41,208	18,873	16,076	38,847
Black plates	5,679	1,178	1,520	5,122
Steel sheets			6,299	16,399

As in January and recent months, exports of steel rails, galvanized sheets and tin plate have shown the most marked recovery.

Pig iron imports in March were 8,681 compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in March were 215,562 tons, which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in March were 11,141 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

## RAILROAD EQUIPMENT

### New Business of Baldwin Works Far Ahead of Last Year—Bids on Cars

The Baldwin Locomotive Works announces that since Jan. 1 new business has been 35 per cent greater than for the corresponding period last year and that the value of unfilled contracts on May 1 showed an increase of \$3,000,000 more than the total on Oct. 1, 1921. Operations are now at more than 30 per cent of capacity. The American Locomotive Co.'s bookings in April are announced as 210 domestic and 11 foreign locomotives, or the largest month's business in years.

While no contracts for new cars have been announced this week, it is understood that the Newport News Shipbuilding & Dry Dock Co. was the low bidder on 3000 cars for the Chesapeake & Ohio Railroad. The same road is inquiring for 500 40-ton box cars and the Belt Railway of Chicago is in the market for 450 gondola cars. Inquiries for 30 open-top cars have been made by the San Antonio Southern and for 24 ore cars by the United Verde Copper Co.

Orders for about 50 locomotives are reported placed during the past week with the two largest builders. Among these may be mentioned 25 Mikado type for the Patagonian Railway, 20 Pacific type for the Atlantic Coast Line, 2 switching locomotives for the Boston & Maine, and two 4-wheel switching engines for the Wayne Coal Co.

The only new inquiries noted are five consolidation type locomotives for the Norfolk Southern and six six-wheel switching locomotives for Peoria & Pekin Union.

The Lima Locomotive Corporation has taken five industrial locomotives for Pickands, Mather & Co.

## IRON AND INDUSTRIAL STOCKS

## Investment Again Attracted to Shares and Bonds with Values Steadier

Speculation apparently has shifted largely to oil shares. Investment is again attracted to iron and industrial shares and bonds, and this fact is reflected in steadier values following a slight setback. The Federal Reserve system is much less concerned in inducing liquidation and more interested in acquiring paper, a strong indication that the recovery in domestic industry and business is not transitory. The recovery in sterling exchange suggests that trade conditions on the other side of the water are improving as well. The depreciation in our grain values is offset by the appreciation in raw cotton, thus the aggregate agricultural purchasing power has not lessened. Advancing finished steel and pig iron prices are fundamental factors that have encouraged investment in iron and steel securities.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chal. ....	48 1/4 - 50 3/4	Int. Har. pf. ....	-112 3/4
Allis-Chal. pf. ....	98 - 99 1/4	Lack. Steel ....	58 - 61
Am. B. S. & F. ....	60 - 62 1/4	Lima Loco. ....	110 1/2 - 113 1/4
Am. B. S. & F. pf. ....	-105	Lima Loco. pf. ....	111 1/2 - 113
Am. Can. ....	47 1/2 - 49 3/4	Midvale Steel ....	36 1/2 - 39
Am. Can. pf. ....	104 1/4 - 104 3/4	Nat.-Acme ....	20 - 20 3/4
Am. Car & F. ....	160 1/2 - 162 1/4	Nat. En. & Stm. ....	40 - 42 3/4
Am. Car & F. pf. ....	119 1/2 - 120	N. Y. Air Brake. ....	78 3/4 - 80
Am. Loco. ....	115 - 117 1/4	Nova Scotia Steel ....	30 - 31
Am. Loco. pf. ....	116 - 116 1/4	Otis Steel ....	13 1/2 - 14 3/4
Am. Radiator ....	96 - 98 3/4	Pressed Steel ....	79 1/2 - 81
Am. Stl. Fdries. ....	38 1/2 - 39 3/4	Pressed Steel pf. ....	-98
Am. Stl. F. pf. ....	-100	Ry. Stl. Spring. ....	101 1/2 - 103 3/4
Bald. Loco. ....	115 1/2 - 120	Ry. Stl. S. pf. ....	-110 1/4
Bald. Loco. pf. ....	112 1/2 - 112 3/4	Replogie Steel ....	31 - 34 1/4
Beth. Steel ....	74 - 75 1/2	Republic ....	62 - 66 1/2
Beth. Stl. Cl. B. ....	77 3/4 - 79 3/4	Republic pf. ....	89 1/2 - 94
Beth. Stl. 8% pf. ....	112 1/2 - 112 3/4	Sloss ....	44 - 45 1/2
Brier Hill ....	21 - 22	Steel of Canada. ....	67 1/2 - 67 3/4
Br. E. Stl. 1st pf. ....	75 - 75 1/2	Superior Steel ....	36 - 37
Br. E. Stl. 2d pf. ....	-27	Trans.-Williams. ....	40 - 42 1/4
Chic. Pneu. Tool. ....	66 3/4 - 67 3/4	Un. Alloy Steel. ....	34 - 35 1/2
Col. Fuel ....	30 3/4 - 34 3/4	U. S. Pipe ....	34 1/4 - 36 3/4
Cruc. Steel ....	64 1/4 - 67 3/4	U. S. Pipe pf. ....	67 3/4 - 69 1/4
Cruc. Steel pf. ....	91 1/4 - 95	U. S. Steel ....	97 1/2 - 99
Dom. Steel ....	-29	U. S. Steel pf. ....	118 1/4 - 119
Gen. Electric ....	162 1/2 - 164 1/4	Vanadium Steel. ....	41 1/2 - 47 3/4
Gl. No. Ore Cert. ....	39 1/4 - 40	Va. I. C. & Coke ....	50 - 55 3/4
Gulf States Steel ....	83 1/2 - 88	Westhouse Air B. ....	95 - 96
Inland Steel ....	-56	Westhouse Elec. ....	61 1/2 - 62 3/4
Int. Har. ....	95 3/4 - 96 3/4		

## Sloss-Sheffield Loss

The Sloss-Sheffield Steel & Iron Co., for the year 1921 reports a net loss, after interest charges, inventory adjustment, depreciation and depletion, of \$1,113,417, against a profit of \$1,893,779 in 1920. The profit in 1920, after deducting preferred dividends, was equal to \$14.24 a share on the \$10,000,000 common stock outstanding.

The detailed income account for 1921 and 1920 follows:

	1921	1920
Operating profits.....	\$1,150,289	\$3,847,364
Coke oven loss.....		*455,057
Interest .....	334,500	352,500
Inventory adj. ....	1,627,774	
Liberty bond loss.....		158,060
Depreciation and depl. ....	301,432	587,968
Federal taxes .....		400,000
Net loss .....	\$1,113,417	*\$1,893,779
Preferred dividends .....	469,000	469,000
Common dividends .....	150,000	600,000
Deficit .....	\$1,732,417	†\$824,779
Profit and loss surplus.....	\$36,224,094	\$7,933,047

\*Income. †Surplus.  
†After crediting \$23,464 provision for 1920 Federal taxes in excess of amount paid.

J. W. McQueen, President of the company, said that "abnormal business conditions which began to lay heavy hand upon all industry during the fall of 1920 completely demoralized the iron trade and brought business to a standstill early in the first quarter of 1921. This condition continued throughout the entire year. Output was, of necessity, greatly curtailed; operations at many plants were suspended entirely, and we found pig iron production for the year was the smallest since organization of the company, being only 15 per cent of tonnage manufactured in 1920.

## Reorganization Progressing

Reorganization plans for the Rivett Lathe and Grinder Co., Boston, are progressing favorably and an early termination of the present receivership is anticipated. The receivership is a friendly one, instituted in March for the purpose of conserving the company's assets, safeguarding creditors, and maintaining uninterrupted operation of the plant. The court

authorized the receiver to continue production, ample funds being provided through the sale of receiver's certificates. The company has and is accepting new business and making shipments of product against same. A complete line of stock products also is in the course of construction. No change has been made in the company's personnel.

## Republic Iron &amp; Steel Shows Improvement

For the quarter ended March 31, 1922, Republic Iron & Steel reports a deficit of \$712,082 after taxes and charges. This compares with surplus of \$104,611, or 42 cents a share on the \$25,000,000 preferred stock in corresponding period of 1921, and with a surplus of \$1,777,317 in 1920 which paid preferred dividends, earned \$4.46 a share on its common stock, and left a surplus after all disbursements, of \$889,817.

This report compares favorably with preceding quarters and shows an upward tendency, as only in one-quarter of last year, the first, did Republic make better showing than in three months ended March 31.

Improvement indicated by first quarter report is probably due largely to fact that inventory losses were small or non-existent. Company at close of last year wrote inventories down to conservative level and did away, entirely or almost so, with the drain on earnings caused by constantly declining values of materials on hand. Quarter's earnings were probably affected but slightly by improvement in steel situation this spring but this should begin to make effect visible in current period.

## Industrial Finances

The Lackawanna Steel Co., Buffalo, did not make a profit in the first quarter of 1922, but shows a much smaller deficit than for the last quarter of 1921. The deficit for first quarter of this year was \$479,972 as compared with a deficit in the preceding quarter of \$1,465,222. The company made a profit of \$8,735 in the first quarter of 1921, but since then its business has shown a loss.

A friendly suit has been begun in the Superior Court at Indianapolis for the appointment of a receiver for the Midwest Engine Co., Indianapolis, carrying out the agreed-on plan for the reorganization of the concern into the Midwest Engine Corporation. The plant has been in operation under the management of a creditors' committee. The reorganization plan includes the raising of \$1,000,000 new working capital by the sale of bonds and most of the amount is in hand. In addition to the fixed assets, the company will have \$3,000,000 of current assets, a total of \$12,875,433 "nominal value." In addition to the Indianapolis plant, at Martindale avenue and Nineteenth street, the company owns a pump works at Anderson, Ind. The petition for a receiver sets out that the company has large orders on hand and asks that the receiver be empowered to operate the plant until the indebtedness is paid. The application to the court is made by John G. Wood, president Midwest Engine Co.

The Abrasive Co. of Canada, Ltd., manufacturer of artificial abrasives, held its annual shareholders' meeting in Philadelphia in March. The directors were re-elected. At the directors' meeting the following officers were re-elected: Frederick S. Dickson, chairman of the board; Louis T. Byers, president; J. Harvey Byers, vice-president and general manager; Lawrence J. Morris, vice-president; Samuel P. Byers, secretary and treasurer.

The American Tube & Stamping Co., hot and cold rolled steel, Bridgeport, Conn., at its annual meeting recently elected the following officers for the ensuing year: President, Edmund C. Mayo; vice-president, F. Kingsbury Curtis; treasurer, Guy P. Miller; secretary, Walter L. Warrell. The directors elected were: J. V. W. Reynders, R. Fulton Cutting, William R. Webster, Carlton Macy, C. L. Dimon, W. L. Abbott, E. Edwards Macy, Charles G. Sanford, W. Beach Day and Frederic J. Kingsbury. Mr. Mayo, president of the company, stated that the east end plant of the company will open up about the second week in May. This plant has been closed for over a year. The west end plant of the company has been operated on a part time basis right through the trade depression.

Frank A. Scott, receiver for the Standard Parts Co., Cleveland, has settled a claim of patent infringement against the General Motors Corporation. It was contended by the Standard Parts Co. that the Jaxon Steel Products Co. infringed patents dated Sept. 14, 1915, relating to rims. By the terms of the settlement the corporation has taken a license under these patents and has paid approximately \$25,000 for past infringement, this amount having been offset against the claim of the corporation against the Standard Parts Co.

The assets of the Stark-Inland Machine Works, St. Louis, manufacturers of piston rings and other automotive products, have been purchased by the Inland Products Co., a new corporation organized under the laws of Missouri with a

capital stock of \$500,000. Clyde C. Miner has been elected president and general manager. The company plans to erect a new factory.

The Remington Arms Co., Inc., Bridgeport, Conn., has sold \$8,500,000 first mortgage 6 per cent sinking fund series A bonds dated May 1, and maturing in 1937, to Boston bankers, who in turn have sold them to investors. The bonds constitute the company's sole funded debt.

The Bristol Motor Parts Corporation, Forestville, Conn., capitalized at \$50,000, which began business in 1917 with John W. Bryce as president, has begun action to dissolve.

Stockholders of the Standard Steel Car Co. have approved an increase in the capitalization from \$5,000,000 to \$50,000,000.

Robert H. Newman has been made receiver of the Morris Metal Products Co., Bridgeport, Conn., following involuntary bankruptcy proceedings brought against the company in April. Attachments in the case amount to approximately \$400,000.

The Laconia Car Co., Laconia, N. H., in the three months ending March 31 last, showed a small operating profit, against a loss in the preceding quarter. Current assets on March 1 were \$775,700 and net working assets \$533,800, contrasted with \$568,000 and \$537,000, respectively, on Dec. 31. With the exception of the foundry, the plant is running full.

The Wickwire Spencer Steel Co. for the first quarter of 1922 reports net profits of \$42,427, after expenses and charges but before depreciation. In the last quarter of 1921 the company reported a loss of \$376,062 and in the first quarter a loss of \$192,252.

The Greenfield Tap & Die Corporation, Greenfield, Mass., for the first time since December, 1920, showed an operating profit in March. The profit was slight to be sure, \$6,000 on a turnover of \$218,000, but nevertheless a profit.

New York bankers have purchased and in turn have resold for investment \$4,000,000 Rogers-Brown Iron Co. 7 per cent 20-year general and refunding bonds dated May 1 and maturing in 1942. The bonds are a portion of a \$20,000,000 issue. This public financing is the first the company has done in 12 years.

The plant of the Barney & Smith Car Co., Dayton, Ohio, which has been operating under receivership for the past two years, has been ordered to be sold to meet a \$2,000,000 bond issue, underwritten by the Guaranty Trust Co. Appraisers have been appointed by the Common Pleas Court to appraise the property and bids will be received by the Sheriff only in the amount of two-thirds of the appraised value and must be accompanied by a \$50,000 deposit.

The Troy Wagon Works Co., Troy, Ohio, has been placed in the hands of a receiver, Martin Crow having been appointed by the court. A number of West Virginia coal companies are the petitioners. The company is involved in litigation with a Belgian broker, who claims \$1,250,000 in commissions due him as a result of transactions with foreign governments for the sale of the company's products.

A meeting of the stockholders of the East Iron & Machine Co., Lima, Ohio, will be held May 18 to consider plans for a reorganization. The company has been under the hands of the receiver since September, 1920, but has continued in operation. The Federal Court has authorized the sale of the company's pump manufacturing machinery and patterns and it is the intention of the company to concentrate its efforts in the making of asphalt manufacturing plants.

The Standard Sanitary Mfg. Co., Pittsburgh, has declared the regular quarterly dividend of 1½ per cent on the preferred stock and 2 per cent on the common stock, payable May 15 to stockholders of record May 4.

In the quarter ending March 31 last the Gulf States Steel Co., after all charges, showed net earnings of \$80,316, equivalent to the preferred dividend requirements for that period and about 40c. a share on the outstanding common stock. For the corresponding quarter in 1921 there was a deficit of \$102,917, and in the last three months of 1921 a deficit of \$11,937. The showing for the first quarter of this year was due largely to the improvement of business during March.

The quarterly report of the Gulf States Steel Company for the period ended March 31, 1922, showed net income of \$80,316. The net operating income for the period totaled \$166,956.

The W. F. Concannon Shear Co., Inc., solid steel scissors and shear manufacturer, Milford, Conn., has recently filed a certificate increasing the capital stock of the concern from \$20,000 to \$50,000. The company will remove to Bridgeport, Conn., in the near future.

Final reports filed by J. Frank Gerdis, trustee of the bankrupt estate of the John Obenberger Forge Co., Milwaukee, indicate that unsecured creditors will realize nothing. These claims were scheduled at \$490,450 in the voluntary petition in bankruptcy filed more than a year ago. The trustee reported income of \$363,794 and disbursements of \$334,808 to secured creditors, leaving a balance of \$29,166, while the

Government's claim for income taxes, which takes precedence over all other claims, amounts to \$64,393.

The Cleveland-Cliffs Iron Co., Cleveland, suffered a loss in operations of \$125,408 during 1921, as is shown by its annual report. To this was added \$1,530,229 for reductions of inventories down to market or replacement values, making the total net loss for the year \$1,655,637. Adding \$527,742 paid in dividends makes a total of \$2,183,379, which, after being deducted, leaves a profit and loss surplus account on Dec. 31, 1921, of \$29,992,016.

A final certificate of dissolution of the Lundin Electric & Machine Co., New Haven, Conn., formerly a \$100,000 corporation, has been filed in that State.

The 1921 report of the Williams Tool Corporation, Erie, Pa., shows profits of \$25,061, which are equal to about \$8 a share on the company's preferred stock capitalization. The current assets at the close of the year were \$157,159, and current liabilities \$34,757.

Harbison Walker Refractories Co. has declared the regular quarterly dividends of 1½ per cent on the common stock, payable June 1, to stockholders of record May 20, and 1½ per cent on the preferred, payable July 20, to stockholders of record July 10.

Virginia Iron, Coal & Coke Co. for the quarter ended March 31, 1922, reports net loss of \$81,047 after interest, taxes, etc., as compared with net loss of \$71,698 in the preceding quarter, and net income of \$471,356, or \$4.71 a share earned on the \$10,000,000 capital stock in the corresponding quarter of 1921.

The Standard Screw Co., Jersey City, N. J., in its twenty-second annual report, covering operations for 1921, shows a net income after making ample provision for depreciation and taxes, of \$125,614. With a previous surplus of \$7,462,466, 6 per cent was paid on preferred stock and 20 per cent on common, leaving a surplus as of Dec. 31, 1921, of \$6,712,918.

## Trade Changes

The Chicago branch of the Driver-Harris Co., Harrison, N. J., now occupies enlarged quarters at 562-574 West Randolph Street, Chicago. It is serving the various industries using its nichrome products which are made in the form of alloys for electrical resistance and castings used in high temperature work.

The Frank B. Pope Co., fire brick and clay, has moved its offices from the Arrott Building to 2223 Oliver Building, Pittsburgh.

The Pittsburgh office of the Cleveland Crane & Engineering Co., and the Cleveland Punch & Shear Works Co., will be moved from 1402 First National Bank Building to 511 Farmers' Bank Building, Pittsburgh, May 1. F. J. Brittingham is Pittsburgh manager.

The Cleveland Crane & Engineering Co., Wickliffe, Ohio, announces that the Colonial Supply Co., Pittsburgh, will in the future carry in stock and take orders for its electric tram rails.

The Max Ams Machine Co., New York, announces that its new office in Rochester, N. Y., has been opened at 705 Commerce Building. H. S. Freeman, who was the Western representative of the company, is in charge.

E. F. Keating Co., 452 Water Street, New York, is now acting as distributor in their district for the products of the Standard Seamless Tube Co., Ambridge, Pa. A complete line of cold drawn and hot rolled seamless steel boiler tubes have been added to the regular stock of lap welded steel and charcoal iron tubes.

The Booth Electric Furnace Co. has changed its address from 326 Madison Street to 411 North Wells Street, Chicago.

The Simmons Machine Co., Inc., Albany, N. Y., has changed the address of its New York City branch from 801 Singer Building to 182 Lafayette Street.

The Simms Magneto Co., East Orange, N. J., will open a branch office and show room at 5781 Woodward Avenue, Detroit. L. F. Acker has been appointed manager and will cover the states of Ohio and Michigan from the Detroit office.

The Stark division of the United Alloy Steel Corporation, Canton, Ohio, has established a sales department for its sheet metal products in the United Alloy's Cleveland office in the Swetland Building. N. L. Schneider, who has been located at the main office in Canton, will have charge of the sheet sales in the Cleveland office.

Crocker Brothers, iron and steel merchants, have moved their Boston office from 24 Milk Street to 53 State Street, Stock Exchange Building, Room 508.

After April 22, the general offices and show rooms of the following companies of the Iron Products Corporation will be located at 41 East Forty-second Street (the Liggett Building): The Central Foundry Co., Central Iron and Coal Co., Chattanooga Iron and Coal Corporation, Molby Boiler Co., Central Radiator Co.

# Machinery Markets and News of the Works

## MARKET QUIET

### Single Machines Continue to Predominate— More Inquiries Than Orders

#### A Chicago Steel Company Enters Market—Buying by Automotive Industries Expected

Although a slight improvement in the machine tool trade is noted in some centers, the market is in general quiet. Sales of single machines continue to predominate and inquiries outnumber orders. In Milwaukee inquiry from railroads has been developing and purchases are beginning to be made. Used machinery is active in some districts.

A Chicago steel company has entered the market for a pipe threading and cutting-off machine, an engine lathe, a shaper, a radial drill, a surface grinder and a horizontal boring and drilling machine, all of them to be arranged for direct-current motor drive.

Orders are expected to come from the Sante Fe in two or three weeks. This road is also inquiring for a 150-ton overhead crane for its Albuquerque, N. M., shop. The Milwaukee Board of Industrial Education is inquiring for miscellaneous tool equipment for the second unit of the Central Continuation School. A New Hampshire school department is inquiring on a fairly large list, but the prospect is still in the tentative stage.

The Lorain Steel Co. is expected to place four cranes soon and the Big Four Railroad will probably close this week on machines for its Kankakee shops.

## New York

NEW YORK, May 9.

There is a slight improvement in the machine-tool trade in some directions. While there is no large buying, there is a better distribution of orders for single tools. An Albany, N. Y., manufacturer bought three turret lathes. An order for more than one or two machines nowadays ranks as exceptional. An Eastern machine-tool company has received orders from its Western offices for several tools for the St. Louis & San Francisco Railroad. A carwheel company has bought a large axle lathe. The machine-tool trade is expecting that extensive purchases will be made soon by the H. H. Franklin Mfg. Co., Syracuse, N. Y., for the manufacture of its new four-cylinder automobile. Prices have been submitted on a large number of tools, but the Franklin company has been delaying action for some time pending the outcome of new financing plans.

A slight improvement in crane sales was evident the past week. Nevertheless, the desire of buyers still seems to be to fill their needs with second-hand cranes whenever possible. The Watson Machine Co., Paterson, N. J., is still deliberating between the purchase of a 15-ton and a 5-ton overhead crane for its requirements. J. J. Spur & Co., Newark, N. J., are on the point of closing for a 5-ton overhead traveling crane. The New York Municipal Railways Co. has not yet closed for the 2-ton pillar crane, for which it has been in the market for several weeks. The Standard Oil Co., 26 Broadway, New York, has changed the specifications on the 10-ton electric crane recently inquired for and is now asking for prices on a 20-ton hand powered crane for Bayway, N. J., and an additional inquiry calls for a 8-ton, 31-ft. span hand power crane for Bayonne, N. J. The manufacturing department of the Pullman Co., Pullman Building, Chicago, has asked for quotations on a 10-ton, 100-ft. span

in the Cleveland district, the largest inquiry about to be closed is from southern Ohio for machines aggregating \$14,000.

From Chicago it is reported that the automotive industries are again commencing to take an interest in machine tools. In Milwaukee the automotive industry continues the high light in machine tool demand. In Cleveland the trade is closely watching the automobile field expecting more buying by car builders if their sales hold up.

The Maxwell Motor Car Co., which recently issued a list of wood working machines, is expected to be a purchaser in the near future.

It is expected that extensive purchases will be made soon by the H. H. Franklin Mfg. Co., Syracuse, N. Y., for its new four-cylinder automobile. Action has been delayed pending the outcome of new financing plans. The Allyn-Zeder Motors Co., which will be formed in Cleveland as a reorganization of the Cleveland Tractor Co., will probably need considerable equipment, although it is stated that its list of requirements cannot be issued before two or three months. The Studebaker Corporation plans to build another addition to its South Bend, Ind., plant.

A source of demand expected to show activity within three to six months is the vocational training schools in Wisconsin, of which there are ten under construction.

In the Pittsburgh district much interest among builders of cranes and other heavy machinery is shown in the report that the Carnegie Steel Co. is about ready to go ahead with completion of the by-product plant at Clairton, Pa.

overhead traveling crane for the Haskell & Barker Car Co., Michigan City, Ind. The Otis Elevator Co., Yonkers, N. Y., with a list of eight small cranes will probably close this week.

Among recent sales are: Pawling & Harnischfeger Co., a 20-ton, 50-ft. span overhead traveling crane to the Wheeler Condenser & Engineering Co.; Shaw Electric Crane Co., a 5-ton bucket handling crane to the Morris & Somerset Electric Co., Morristown, N. J., and a 30-ton stationary gantry crane to the Lehigh Valley Railroad, Newark, N. J.

The Department of Plant and Structures, Municipal Building, New York, has filed plans for a one and two-story machine repair shop, 184 x 357 ft., for the Department of Street Cleaning, estimated to cost about \$600,000, including equipment. Grover A. Whalen is commissioner.

The Erie Railroad Co., 50 Church Street, New York, is planning the erection of a one-story brick and steel addition to its car and locomotive shops at Hornell, N. Y., to cost close to \$200,000 with machinery.

The Studebaker Corporation of America, 1700 Broadway, New York, has plans under way for a three-story service and repair building, 175 x 180 ft., on Dean Street, Brooklyn. I. C. Jones is in charge. Tooker & Marsh, 101 Park Avenue, New York, are architects.

Oscar Berger, Long Island City, has acquired property in the Thompson Hill section and will commence the immediate erection of a one-story foundry for the manufacture of brass and bronze castings.

The MacGovern Co., 114 Liberty Street, New York, is making inquiries for two bending rolls, one to be 96 in. long and 9 in. in diameter, and the other, 146 in. long and 20 in. in diameter.

The E. Steinhilber Co., Eagle and Mohawk streets, Utica, N. Y., manufacturer of sheet metal specialties, will commence

the immediate construction of a new one-story plant, 75 x 140 ft., to cost about \$25,000.

The International Paper Co., 30 Broad Street, New York, has preliminary plans under way for a series of hydro-electric generating plants in northern New York, supplementing a power plant at Sherman Island, upon which work has commenced, to have a capacity of 20,000 hp. and expected to be ready for operation early in 1923. It is proposed to sell electric power for commercial service, and transmission and distributing systems will be built for this purpose.

A one-story power house, 46 x 50 ft., will be erected by the Gotham Silk Hosiery Co., 516 Fifth Avenue, New York, at its new mill at 401-9 East Thirty-third Street.

A vocational department will be installed in the three-story high school to be erected at Cedarhurst, L. I.; estimated to cost \$200,000. William Adams, 15 West Thirty-eighth Street, New York, is architect.

The National Marble & Slate Corporation, 236 West Fifty-fifth Street, New York, has leased ground at 617-19 West Forty-eighth Street, for the erection of a new two-story plant to cost about \$75,000. Machinery installation will include a crane and hoisting equipment. John J. Burns is president, and James D. Corsa, treasurer.

The Estate of Adolph Starke, Columbia Street, Brooklyn, manufacturer of spikes, nails, etc., is making inquiries for a 10-ton electric hoist.

The Valvoline Oil Co., 60 Broadway, New York, with refineries at Edgewater, N. J., Warren and Butler, Pa., is arranging for a bond issue of from \$5,000,000 to \$10,000,000, a portion of the proceeds to be used for additions to working capital and plant expansion.

The Transit Commission, 49 Lafayette Street, New York, will receive bids until May 15, for track equipment and materials.

The International Nickel Co., 67 Wall Street, New York, is planning the erection of an addition to its works at Port Colborne, Ont., 90 x 140 ft.

The State Engineering Department, Albany, N. Y., Frank M. Williams, Telephone Building, State engineer, has plans in progress for two electric generating plants for barge canal service, to be located at Fischers Ferry and Crescent, respectively, estimated to cost about \$1,000,000, with equipment. It is expected to call for bids in July.

The Republic Motor Truck Co., 657 West Fifty-seventh Street, New York, has leased the second floor in the building at South Jane and William streets and Ely Avenue, Long Island City, for a service and repair works.

Plans will soon be filed for a new power house at the Teachers' College, Broadway and 120th Street, New York, in conjunction with a new library building, estimated to cost \$1,500,000.

Benjamin Spielberg, 28 Brinkerhoff Street, Plattsburg, N. Y., is having plans prepared for the erection of a two-story machine and repair shop, 60 x 90 ft.

The Thirty-sixth Street Garage, Inc., 256 West Thirty-sixth Street, New York, will commence the erection of a three-story garage and service building, 75 x 100 ft., with machine shop, at 103 West 108th Street, to cost about \$60,000. Bloch & Hesse, 18 East Forty-first Street, are architects.

A vocational department will be installed in the two-story high school, 60 x 140 ft., to be erected at Rotterdam Junction, N. Y., estimated to cost \$125,000. Edward G. Atkinson, 426 State Street, Schenectady, N. Y., is architect.

The Radio Corporation of America, Woolworth Building, New York, is planning for the construction of several superpower wireless stations for international service in South America and other points. The first plant will be at Monte Grande, near Buenos Aires, Argentina. Edward J. Nally is president.

Fire, May 3, destroyed a portion of the four-story Elk Garage, 115 East Seventy-fourth Street, New York, with loss estimated at \$150,000, including equipment, cars, etc.

A vocational department will be installed in the new high school to be erected at Chatham, N. J., estimated to cost about \$140,000.

The Research Corporation, 31 West Forty-third Street, New York, is considering a site at Dover, N. J., for the erection of new machine shops and structural iron working plant. Other locations in New Jersey also are said to be under consideration.

Carl Schallbruck, care of Rudolph Webster, 76 Boyden Avenue, South Orange, N. J., is arranging for the establishment of a plant at Newark to manufacture cutlery. Mr. Schallbruck formerly operated a similar plant at Zollinger, Germany, now discontinued for the proposed new factory at Newark.

Krementsz & Co., 49 Chestnut Street, Newark, manufac-

turers of metal goods, plated specialties, have been incorporated under State laws with a capital of \$2,000,000 for expansion. It is headed by Richard and Walter M. Krementsz.

The Public Service Electric Co., Public Service Terminal, Newark, will install new equipment and build new transmission lines at its Essex and Marion power plants for power supply for the construction of New Jersey-New York vehicular tunnel. A contract totaling approximately \$500,000 has been secured for the service.

The Magna Metal Corporation, Doremus Avenue, Port Newark, Newark, has preliminary plans under way for an addition. It will be equipped to manufacture a special light metal of heavy tensile strength.

The De Cozen Motor Car Co., 20 Branford Place, Newark, has awarded contract to the Essex Construction Co., 85 Academy Street, for a three-story service and repair building at 968-70 South Broad Street, to cost about \$80,000.

## Chicago

CHICAGO, May 8.

Business continues to show improvement, although inquiries still greatly outnumber orders. With the closing of even a portion of the equipment pending in the market, this month will easily prove the best from the standpoint of sales thus far this year. The automotive industries are again commencing to take an interest in machine tools, although the major portion of these orders are placed through Detroit dealers. One recent purchase of tools, part of which was closed through a Chicago machine tool house, involved four Cincinnati automatic milling machines, two cylinder boring machines, a number of Ingersoll planer-type milling machines and several "Nasco" drilling machines for the Continental Motors Co., Muskegon, Mich. Other automotive manufacturers who are reported to be buying machine tools are the Durant, Studebaker, Hudson, Chevrolet and Willys-Overland companies. The Studebaker Corporation plans to build another addition to its South Bend, Ind., works to cost \$3,000,000. No further action has been taken by the railroads, but orders are expected to come from the Santa Fe in two or three weeks. This road is also inquiring for a 150-ton overhead traveling crane for its Albuquerque, N. M., shops.

A local steel company has entered the market for the following machines arranged for direct current motor drive: One pipe threading and cutting off machine for threading and cutting  $\frac{1}{4}$  in. and 4-in. pipe, one 27-in. engine lathe, 36-in. radial drill, one surface grinding machine with magnetic chuck for work up to 18-in. in diameter, and one horizontal boring and drilling machine with  $5\frac{1}{2}$  in. spindle arranged for adjustable speed drive.

Building permits issued in Chicago for the month of April showed a large increase over the same month of 1921. In April of this year permits for 1315 buildings were issued with a frontage of 38,077 ft., involving expenditure of \$17,076,560, as compared with permits for 533 structures in April, 1921, involving 15,827 ft. frontage and a cost of \$15,198,900.

The Williams Mfg. Co., Elgin, Ill. recently incorporated with \$20,000 capital stock, has leased a two-story plant, 25 x 75 ft., at 69 North Street and is manufacturing chiropractic adjusting tables and physicians' and undertakers' supplies. It has all the manufacturing equipment it requires at present. The officers are: President, William G. Williams; vice-president, Peter Lorang; secretary and treasurer, William Lorang.

The Scientific Metal Products Co., Chicago, recently incorporated with \$10,000 capital stock, has leased a plant with 2500 sq. ft. of floor space at 658-60 West Division Street, and is manufacturing surgical instruments and appliances, special machinery, tools, dies, etc. It has all the equipment it requires at present. Officers are: President, Frank Nemec; vice-president, Richard Preiss; secretary and treasurer, George M. Skubella.

The Radio Telephone Co., 160 North Wells Street, Chicago, recently incorporated with \$15,000 capital stock, will manufacture the "Electra-voice" loud speaker for radio, vocal and musical reproduction, patented radio apparatus and flasher tubes. It expects to lease a plant in Chicago, but has not yet determined the amount of machinery which it will purchase. The officers are: President, William G. Keith; secretary, B. E. Cover; treasurer, Edward G. Hall; general manager, P. S. Bear.

The Progress Duster Co., 541 West Roosevelt Road, Chicago, has let contract for a two-story plant, 64 x 125 ft., 1100-04 California Avenue, to cost \$20,000.

The Combination Woodworking Machine Co., recently incorporated with \$25,000 capital stock, has leased a plant at 1334 West Belmont Avenue, Chicago, and is manufacturing a wood-working machine designed to perform the functions of several machines, such as a saw, jointer, planer, borer,

sander, carver, etc. The company has all the manufacturing equipment it requires at present. The officers are F. H. Stahl, president; George E. Keroson, vice-president; Eugene Wetzel, secretary and treasurer.

The Duffin Iron Co., 4837 South Kedzie Avenue, Chicago, is taking bids for a two-story addition, 40 x 60 ft., for general iron and steel working. Mundie & Jensen, 39 South La Salle Street, are architects. John Duffin is head.

The Producers' & Refiners' Corporation, California Building, Denver, Col., with refineries at Blackwell and West Tulsa, Okla., has sold a bond issue of \$2,000,000, a portion of the proceeds to be used for additional working capital, plant extensions and betterments. F. E. Kistler is chairman of the board.

The Dowling Iron Works, Lincoln, Neb., is having plans prepared for an addition, totaling about 3000 sq. ft. of floor space. A. C. Koenig, Bankers' Life Building, is engineer.

The Chicago Union Station Co., 600 West Jackson Street, Chicago, is having plans prepared for a new one-story and basement power house, 50 x 165 ft., at Harrison and Canal streets. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects. J. J. Turner is president.

The United Light & Railway Co., Davenport, Iowa, will make extensions and improvements in its power plant and system to cost in excess of \$200,000.

The Iowa Electric Co., Cedar Rapids, Iowa, will call for bids for a new hydroelectric generating plant on the South Fork of the Maquoketa River, estimated to cost about \$175,000. Holland, Ackerman & Holland, Inc., 53 West Jackson Boulevard, Chicago, are engineers. John A. Reed is vice-president in charge.

A vocational department will be installed in the new three-story and basement junior high school, 160 x 200 ft., to be erected at Cedar Rapids, Iowa, estimated to cost about \$400,000. Bids will be asked in June. Herbert Rugh, 811-13 Security Building, is architect.

The Shrauger & Johnson Co., Atlantic, Iowa, manufacturer of wagon yokes, etc., has plans under way for an addition to cost about \$40,000, including equipment. Vorse, Krietsch & Kraetsch, 911 S. & L. Building, Des Moines, Iowa, are architects.

The City Council, Ames, Iowa, has tentative plans under consideration for an addition to the municipal electric light and power plant. P. F. Hopkins is city engineer.

The Borough Council, Millstadt, Ill., is planning for the installation of new machinery at the municipal electric power plant.

The Common Council, Simla, Col., has plans under way for a municipal electric power house, for which bonds totaling \$100,000, recently were voted.

A vocational department will be installed in the three-story high school to be erected on Nicollet Island, Minneapolis, Minn., by the Catholic Diocese of St. Paul, Minn., 226 Summit Avenue, estimated to cost about \$250,000. Damon, O'Meara & Mills, 1123 Merchants Bank Building, St. Paul, are architects.

The Fort Dodge Gas & Electric Co., Fort Dodge, Iowa, will make extensions and improvements in its plants and system to cost about \$68,000.

The Citizens' Lighting Co., La Salle, Ill., has made application for permission to issue bonds for \$350,000 and preferred stock for \$88,000, a portion of the proceeds to be used for extensions and improvements in the power plant and system.

A vocational department will be installed in the new high school to be erected at Big Springs, Neb., estimated to cost about \$75,000. Bonds have been voted. J. J. Huddart, 409 Bank Building, Denver, Col., is architect.

The George A. Hermel Co., Austin, Minn., has preliminary plans under way for a new refrigerating and cold storage plant and power house. Henry I. Church is engineer in charge.

## Philadelphia

PHILADELPHIA, May 8.

The Hill Independent Mfg. Co., Adams and Emerald streets, Philadelphia, manufacturer of metal hand stamps, stencils, etc., has acquired the factory of the Germantown Spinning Co., High Street and Belfield Avenue, for \$150,000. Enlargements will be made and the present plant removed to this site.

The Philadelphia Steam Heating Co., Juniper and Cherry streets, Philadelphia, has awarded contract to George N. Evans, 105 North Thirteenth Street, for a new two-story and basement building, 25 x 51 ft., at 3316-20 Lancaster Avenue, to be equipped in part as a mechanical and machine shop. J. T. Moswell is vice-president.

I. Ecker, Philadelphia, operating a sheet-metal working plant at 439 Titan Street, has awarded contract for a new two-story plant, 30 x 40 ft., at Sixth and Titan streets, to Frank & Kaiser, 1517 South Sixth Street.

Joseph J. Greenberg, Morris Building, Philadelphia, will soon call for bids for a five-story and basement automobile service and repair building, 55 x 150 ft., at 1409-11 Broad Street, with machine shop, estimated to cost about \$200,000. LeRoy B. Rothschild, 1225 Sansom Street, is architect.

L. J. Kolb, Tenth and Reed Streets, Philadelphia, is arranging for the erection of a two-story automobile service and repair building, with machine shop, at Ridge Avenue the Lenox Street, to cost in excess of \$50,000.

The Quaker City Cold Storage Co., Water and Spruce streets, Philadelphia, has acquired the seven-story building at 300-308 South Delaware Avenue, heretofore held by the Pennsylvania Railroad Co., for a new plant.

The Pierpoint Motor Co., 641 North Broad Street, Philadelphia, agent for the Auburn automobile, has taken over a floor of the building at 3324-26 Ludlow Street, totaling about 8000 sq. ft. for a service and repair works.

The International Harvester Co., 216 North Twenty-third Street, Philadelphia, has awarded contract to the J. S. Rogers Co., Drexel Building, for its five-story distributing plant, and one-story machine works, estimated to cost in excess of \$350,000, including equipment.

The Kensington Hygiea Ice Co., Trenton and Huntingdon streets, Philadelphia, will commence the erection of a two-story ice-manufacturing plant, 65 x 110 ft., at Church and Lackawanna streets.

The Victor Talking Machine Co., Camden, N. J., has organized the Pan-American Recording Co., to operate a branch plant in South America. It is proposed to establish a factory and commence operations at an early date. Eldridge R. Johnson is president.

Motors, controlling devices, electrical and other machinery will be installed in the four-story printing plant to be erected at Camden, N. J., by the Haddon Press Corporation, an affiliation of Harper & Brothers, Franklin Square, New York. The new organization will operate the plant exclusively for Harper publications. It is estimated to cost about \$225,000. T. B. Wells is vice-president.

Fire, May 5, destroyed a portion of the plant of the Andes Mfg. Co., Ephrata, Pa., manufacturer of metal products, with loss estimated at about \$30,000.

Harry Bloom, 61 North Welles Street, Wilkes-Barre, Pa., will build a four-story addition to his automobile service and repair plant, 58 x 75 ft., to cost about \$45,000. Ralph M. Herr, Simon Long Building, is architect.

The Frick Co., Waynesboro, Pa., manufacturer of agricultural machinery, will soon commence the erection of a new one-story foundry, 300 x 600 ft., estimated to cost about \$200,000, including equipment. A. J. Frick is head.

A vocational department will be installed in the two-story high school to be erected by the Catholic Diocese, Altoona, Pa. J. J. McCort, in charge, to be 65 x 105 ft., and estimated to cost \$150,000.

The J. S. Wentz Co., Land Title Building, Philadelphia, coal operator, is planning the construction of a new coal breaker at Raven Run, Pa.

A vocational department will be installed in the new two-story high school to be erected at Throop, Pa., estimated to cost \$170,000. John J. Howley, Traders' Bank Building, Scranton, Pa., is architect.

The Metropolitan Edison Co., Reading, Pa., is disposing of a preferred stock issue totaling \$1,805,830, the proceeds to be used in part for extensions and improvements in power plant and system. E. L. West is president.

The Chester Dairy Supply Co., Hyatt and Ninth streets, Chester, Pa., manufacturer of dairy machinery, etc., has plans under way for a one-story addition, 45 x 150 ft., estimated to cost about \$50,000. A list of equipment has been arranged.

The Borough Council, Chambersburg, Pa., will receive bids until May 15, for a one-story municipal power plant estimated to cost \$150,000. Albert C. Wood, Stock Exchange Building, Philadelphia, is architect.

Peter Lalley, 401 Pittston Avenue, Wilkes-Barre, Pa., will commence the immediate erection of a one-story automobile service building, 80 x 160 ft., with machine shop, to cost about \$75,000. Albert J. Ward, County Bank Building, is architect.

The West Lampeter Township School Board, M. E. Brenner, president, Wilmer, Pa., has commissioned Henry Y. Shaub, Imperial Building, Lancaster, Pa., architect, to prepare plans for a two-story vocational high school at Lampeter, to replace the structure recently destroyed by fire.

## Pittsburgh

PITTSBURGH, May 8.

Many inquiries are before the machinery and equipment trade in this district, but a tendency continues on the part of buyers to defer placing orders. This is partly ascribed to uncertainty about the maintenance of iron and steel plant operations, due to the coal strike. There is much interest among the builders of cranes and other heavy machinery in the report that the Carnegie Steel Co. is about ready to go ahead with the completion of the by-product plant at Clairton, Pa. No official announcement has been made nor have any inquiries gone out, save for estimating purposes, for the machinery likely to be wanted. The Lorain Steel Co., Johnstown, Pa., is soon expected to place the order for four cranes which have been up for some time. The Pittsburgh Des Moines Steel Co. also is expected to act soon on a riveting tower crane. These appear to be the only really live prospects before the trade. Most of the machine tool sales have been of individual machines. The only list about which there has been any publicity is that of the Western Penitentiary, bids on which will close to-morrow. About 14 tools are on this list.

The Jones & Laughlin Steel Co., Pittsburgh, is planning to rebuild the portion of its works in the South Side district, destroyed by fire, May 3, including machine shop, with loss estimated in excess of \$100,000.

A vocational department will be installed in the two-story and basement high school to be erected at Ambridge, Pa. W. Ward Williams, 309 Fourth Avenue, Pittsburgh, is architect.

J. C. Downs, secretary of the Board of Education, Dormont, Pa., will receive bids until May 15, for steel lockers, manual training equipment and other apparatus for a new local high school, as per specifications on file at the office of Press C. Dowler, 612 Magee Building, Pittsburgh, architect.

The West Penn Traction & Water Power Co., Pittsburgh, is negotiating for the purchase of the Monongahela Power & Railway Co., Fairmont, W. Va. Upon acquisition, it plans for extensions and improvements.

A vocational department will be installed in the three-story high school, 90 x 100 ft., to be erected at Windber, Pa., estimated to cost \$150,000. W. C. Crawford, superintendent, Windber School District, is in charge.

The Pocahontas Red Ash Coal Corporation, Iaeger, W. Va., recently organized, is planning the construction of a power house, and the installation of hoisting machinery, loaders and other equipment at its properties. James G. Magowan is president and manager.

The plant and equipment of the Star Car & Foundry Co., Huntington, W. Va., manufacturer of mine cars and machinery, will be offered for sale on May 27 by George S. Wallace, trustee in bankruptcy, Box 276, Huntington.

The American Gas & Electric Co., 30 Church Street, New York, will commence the erection of an addition to its plant at Beech Bottom, W. Va., consisting of two complete generating units. R. E. Breed is president.

The City Council, Fairmont, W. Va., will build a one-story service and repair works on Cleveland Avenue, for municipal motor trucks and cars.

The West Virginia Water & Electric Co., Charleston, W. Va., is disposing of a bond issue of \$3,300,000, a portion of the proceeds to be used for extensions and improvements in the power plant and system. A. C. Babson is vice-president and general manager.

The North Branch Coal Co., Piedmont, W. Va., recently organized, will install new hoisting and electrical equipment, at its properties at Gorman, W. Va. John M. Fahey is president.

Fire, April 28, destroyed a portion of the plant of the Stuart Colliery Co., Summerlee, W. Va., including electrical machinery, hoisting apparatus, cars, etc., with loss estimated at about \$125,000.

## New England

BOSTON, May 9.

The general market for new machines is dull. Small automatic screw machines continue in demand, however, and one line of turret tools is moving better because few are available in the used machinery market. Otherwise little interest is manifested and comparatively large lists which have been hanging fire for some time remain inactive.

The used tool market on the other hand is accumulating prospects with indications for increased sales in the near future. The lack of actual transactions is attributed to the fact that several shops, either directly or through used machinery houses, are cleaning up surplus tools or disposing of entire lots. For instance, a Lowell, Mass., industrial

concern last week sold a considerable amount of surplus equipment to local used machinery interests. David Beal & Co., Boston, purchased the entire equipment of Barrett Brothers, Inc., 43 Haverhill Street, and in turn sold it to a firm about to manufacture radio appliances, some 40 machines being involved. About a dozen machines last week were sold at auction by the Beacon Welding & Apparatus Co., Boston, and brought fairly stiff prices as used equipment values go today. Numerous other similar but smaller transactions have helped to check the movement of used machinery out of local dealers' hands. It is intimated that one of the leading New England cotton mills will sell a large amount of metal-working equipment, having decided to discontinue the manufacture and repair of textile machinery.

Recent inquiries for used equipment include one from the Boston Structural Steel Co., Cambridge, Mass., for a 7 in. shaper, die filing machine, Universal tool grinder, and a No. 20 Bliss punch press or its equal; a 6 x 10-in. Waite die stamping press wanted by the George C. Whitney Co., Worcester, and a 14 in. or 16-in. shaper wanted by a company at 50 Arthur Street, Lawrence, Mass. Sales last week included an Acme turret lathe to a Taunton, Mass., interest, a small Pratt & Whitney hand screw machine and a small power press to Boston radio appliance manufacturers, and four upright drills to a Westboro, Mass., manufacturer.

Bids for the five electric derricks wanted by the city of Boston were rejected. The Lamson Co., Lowell, has closed on bending rolls, a shear and a horizontal bending machine, all new equipment, involving about \$2,500. A New Hampshire school department is inquiring on a fairly large list of equipment, but the prospect is in the tentative stage as the authorities do not yet know what they desire and the erection of the school has not begun.

The International Silver Co., Waterbury, Conn., has let contract for a one-story, 45 x 130 ft. addition at Wallingford, Conn.

The Graham Mfg. Co. has leased manufacturing space at Torrington, Conn., opposite the railroad station, and will install machinery to manufacture metal products.

The Hampden Motor Truck Co., Maple Street, Holyoke, has purchased about eight acres on Meadow Street, Williamansett, Mass., for the erection of a plant in the near future. Richard B. Bloom is president.

The plant of the Hartford Automotive Parts Co., Hartford, Conn., last week was sold to Robert C. Morris, New York, representing the creditors' committee, for \$350,000. Production will continue as heretofore, but the new owners have made no announcement of what they eventually intend to do with the property.

The plant of the Robert Marshall Wood Working Co., Lynn, Mass., was practically destroyed by fire April 28. The estimated loss is \$100,000.

A vocational department will be installed in the new high school to be erected in the Deering district, Portland, Me., estimated to cost \$500,000, bids for which are being received until May 17. Poor & Thomas, 537 Congress Street, are architects.

The Cameron Appliance Co., 48 Waters Avenue, Everett, Mass., manufacturer of mechanical equipment, has plans in preparation for a new one-story factory, 70 x 115 ft., to cost about \$45,000. MacNaughton & Robinson, 101 Tremont Street, Boston, are architects.

The Nash Carriage Co., 841 Massachusetts Avenue, Roxbury, Boston, is planning the erection of new works, 100 x 115 ft., estimated to cost about \$50,000.

The Worthington Pump & Machinery Corporation, 115 Broadway, New York, will install a 25-ton electric traveling crane at its Blake & Knowles Pump Works, East Cambridge, Mass.

The International Blower Co., Hartford, Conn., recently organized, has acquired the plant and business of the Connecticut Blower Co., and will continue operations at 345 Trumbull Street. Expansion is being arranged. The new company is headed by C. H. and S. E. Keeney.

The National Filter Cloth & Weaving Co., 57 Hope Street, Brooklyn, manufacturer of wire cloth and other wire specialties, has awarded contract to the Sperry Engineering Co., New Haven, Conn., for its proposed one-story factory, 60 x 185 ft., at Hamden, Conn.

A vocational department will be installed in the two-story high school, 180 x 240 ft., to be erected at Greenfield, Mass., estimated to cost about \$375,000.

A vocational department will be installed in the three-story high school, 133 x 150 ft., to be erected at Belfast, Me., estimated to cost \$150,000. Kilham, Hopkins & Greeley, 9 Park Street, Boston, are architects.

One-story vocational shops will be erected in connection with the new junior high school at New Haven, Conn., for which the Board of Education has invited architects to submit plans. The structure will be located on the Orphan Asylum tract, Edgewood Avenue.

## Buffalo

BUFFALO, May 8.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of valves, steam specialties, etc., has acquired property at the foot of Genesee and Church streets, Buffalo, as a site for a new branch plant, 200 x 280 ft., estimated to cost about \$250,000.

The Ontario Cutlery Co., Franklinville, N. Y., manufacturer of knives, etc., is planning the erection of a four-story addition, 75 x 200 ft., to cost about \$150,000, including equipment.

The City Council, Dunkirk, N. Y., is considering a bond issue of \$1,400,000 for the installation of a municipal hydro-electric plant and system in connection with waterworks extensions.

The LeRoy Lime & Crushed Stone Corporation, LeRoy, N. Y., is planning for the installation of new crushing, grinding, drilling and other equipment. J. L. Heimlich is in charge.

A vocational department will be installed in the proposed new high school at Jamestown, N. Y., estimated to cost about \$700,000.

The Pennzoil Oil Co., Oil City, Pa., has acquired the plants and property of the Warren Oil Co. of New York in northern New York, including the plant of the Buffalo Refining Co., Buffalo. Extensions and improvements are planned. A. S. Matthews is vice-president and general manager.

The Cohoes Light & Power Co., Cohoes, N. Y., has plans nearing completion for an addition to its electric generating plant to cost about \$900,000, including machinery. Sanderson & Porter, 52 William Street, New York, are engineers.

The National Lamp Works of the General Electric Co., Nela Park, Cleveland, is planning for a one-story addition to its branch works on Fillmore Avenue, Buffalo, to be used as a machine shop.

The Fitzgibbons Boiler Co., Tenth and Mercer Streets, Oswego, N. Y., is planning for a one-story addition to cost about \$40,000.

The E. & O. Mfg. Co., Fredonia, N. Y., manufacturer of signal devices, has acquired a building at Kane, Pa., for a branch plant.

S. A. Cook & Co., Medina, N. Y., will build a one-story power house, 53 x 60 ft., at their furniture plant on West Center Street.

The Warsaw Gas & Electric Co., Warsaw, N. Y., will build a new one-story power plant, 80 x 105 ft. Plans have been completed.

A vocational department will be installed in the new senior and junior high school to be erected at Eastwood, N. Y., for which bonds for \$190,000 have been voted. N. H. LaVaute, Syracuse Savings Bank Building, Syracuse, N. Y., is architect.

The Aldrich Paper Co., Gouverneur, N. Y., has preliminary plans under way for rebuilding its paper mill at Natural Dam, N. Y., recently destroyed by fire. It will cost close to \$500,000, including equipment.

## Baltimore

BALTIMORE, May 8.

The Philipp-Kell Co., Inc., Holliday and Center streets, Baltimore, manufacturer of sheet metal products, will soon break ground for a new one-story plant to cost about \$45,000.

The power plant and system of the New Windsor Electric Light & Power Co., New Windsor, Md., has been acquired by local interests. The company will be reorganized, and extensions and improvements made.

The White Foundry Co., Roanoke, Va., is arranging a list of equipment for installation at its new one-story foundry. Howard H. White, 613 Tenth Avenue, S. E., is president.

A. B. Cooke, Petersburg, Va., is planning to rebuild the power house at his quarry, recently destroyed by fire.

The Eastern Coal & Mining Co., Cumberland, Md., has tentative plans for the installation of electric machinery, hoisting equipment, mine cars, etc., on its coal lands near Hinton, W. Va.

The Chapin-Sacks Mfg. Co., First and M streets, N. E., Washington, will build a new three-story ice-manufacturing plant, 95 x 110 ft., to cost about \$75,000. A. E. Chapin is president.

The Marlborough Automobile Co., Baltimore, has had plans prepared for a one-story service and repair building, 130 x 150 ft., at 1515-19 Madison Avenue.

The Burrus Motor & Tractor Co., Columbus, Ga., has awarded contract to W. C. Whitaker, Columbus, for a two-story plant, 105 x 140 ft., for the manufacture and repair of automobile radiators, truck parts, assembling, etc., estimated to cost about \$60,000.

The National Soapstone Co., First National Bank Building, Roanoke, Va., has plans under way for a one-story power house at Donation, N. C. A new power gang-saw works will also be constructed. C. R. Williams is president.

The Lowery & Blakeman Corporation, Atlanta, Ga., recently organized, is arranging for the establishment of a plant to manufacture a patented metal device for locking automobile steering wheels and other equipment. It is planned to commence operations early in June. Inman Sanders is president, and Chester H. Blakeman, treasurer and general manager, both of Atlanta.

The Standard Lumber Co., Hawkinsville, Ga., will rebuild its plant, recently destroyed by fire. The new works will include a complete band-saw mill, and is estimated to cost in excess of \$40,000, including machinery. C. E. Baumgardner is general manager.

Fire, April 29, destroyed the power house and other portions of the plant of the Newberry Lumber Co., Newberry, S. C., with loss estimated at about \$30,000.

The Auto Electric Repair Co., 932 West Broad Street, Richmond, Va., will install a new lathe, vise and other equipment.

The Automatic Safety Car Step Co., Charlotte, N. C., recently organized, has acquired the plant of the Wizard Automobile Co., for proposed works. Immediate possession will be taken and necessary equipment installed.

A vocational department will be installed in the two-story high school, 92 x 106 ft., to be erected at Packstone, Va. C. R. Reagan, Terry Building, Roanoke, Va., is architect. It will be constructed by the Belfonte School District.

The City Council, Davidson, N. C., is planning the establishment of a municipal electric power house. Bonds for \$60,000 will be arranged for this and other improvements.

## Milwaukee

MILWAUKEE, May 8.

The automotive industries continue to form the high light in machine-tool demand, especially the call for milling machines, grinders and similar equipment. Inquiry from the railroads has been developing at an encouraging rate and purchases are now beginning to be made. A source of demand which is expected to show substantial activity in the near future is the vocational training schools, of which at least ten sizable ones are now under construction. The Milwaukee Board of Industrial Education is inquiring for miscellaneous tool equipment for the second unit of the Central Continuation School. The first unit was equipped mainly from Government salvage and surplus stocks, but present requirements concern new machines more particularly and purchases are being made in the open market. Dealers report a good movement of used machines of the lighter types to garages and service stations. The widespread interest in radio-telephony has induced the conversion of parts of some concerns to the production of apparatus and supplies, while a number of new enterprises are being established in this line.

The D. J. Murray Mfg. Co., Wausau, Wis., founder and machinist, is taking bids for a one-story brick and steel machine shop addition, 60 x 138 ft., designed by Edwin C. Hall, consulting engineer, 1316 Majestic Building, Milwaukee. Equipment will be purchased for the production of logging and sawmill machinery, wood-working tools, repair parts, etc.

The Stoughton Mfg. Corporation, Stoughton, Wis., has been organized with an initial capitalization of \$10,000 to manufacture electrical appliances and devices, principally an automatic heater and a domestic refrigerating unit, designed by Clark M. Osterheld, president and general manager. A development shop is now in operation.

The Marinette Electric Corporation, Marinette, Wis., has been incorporated with a capital stock of \$30,000 to manufacture electrical devices, but more especially apparatus and supplies for radio-telephony and wireless telegraphy. It has leased the former factory of the United Beverage Co., Pierce Avenue, and is purchasing equipment. W. J. Tideman is vice-president and general manager; Francis A. Brown is president and George Mitcheson, secretary and treasurer.

The Miller Spouting Co., West Bend, Wis., has reopened its plant, which has been idle for more than a year, and is resuming the production of flexible metal spouting, as well as flexible hose and spouting joints. It also is adding a line of automotive equipment, including gas tank covers, bumpers, signal lights, robe-rail locks, etc. The production is now in charge of William Griep, for 15 years connected with the Aluminum Goods Mfg. Co., Two Rivers, Wis., and J. B. Adler, for six years in the experimental department of the Ford Motor Co., Detroit.

The Universal Toy & Novelty Mfg. Co., Chicago and Oak Park, Ill., has decided to relocate its plant and offices in Mellen, Wis., where local capital has formed a separate corporation to build a one-story brick, steel and concrete plant, 100 x 150

ft. Besides making a line of hardwood novelties, toys, etc., it will produce cabinets and other wooden specialties for radio-telephony apparatus. W. F. Gibian is president and general manager.

Frank Holton & Co., Elkhorn, Wis., manufacturers of band instruments, brass specialties, etc., have plans by Martin Tullgren & Sons, architect, 425 East Water Street, Milwaukee, for a two-story addition, 40 x 80 ft., of brick and mill construction, which with equipment is estimated to cost about \$45,000. Bids for the erection of the building will close May 15. Inquiry is now being made for tools and other machinery. Harry J. Charlton is secretary.

The Opitz Mfg. Co., Milwaukee, has been incorporated with a capital stock of \$50,000 to manufacture radiators and cooling devices for automotive engines. An existing building will be leased and equipped. Fred W. Opitz, for many years engaged in the manufacture of automobile radiators at Racine, Wis., is promoting the enterprise. Norman L. Baker and Arthur Breslau, attorneys, 738-742 Wells Building, Milwaukee, appear with Mr. Opitz as incorporators.

The Six-Wheel Truck Co., Fox Lake, Wis., manufacturing heavy-duty motor trucks with dual sets of rear wheels, which recently decided to establish its permanent plant and headquarters in Waupun, Wis., has purchased a site at Drummond and Jackson streets. Work will begin May 15 on a one-story brick, steel and concrete machine shop and assembling floor, 50 x 125 ft., costing about \$40,000 with equipment. F. N. Pettigrew is president and chief engineer.

The Madison, Wis., Board of Education has been authorized to proceed with plans for the erection and equipment of a new manual arts institute estimated to cost about \$140,000. It is intended to start work so that the facilities may be available by Sept. 10. Thomas W. Gosling is city superintendent of schools.

The Flambeau Paper Co., Park Falls, Wis., has a three-year enlargement program calling for an estimated investment of \$500,000 in buildings and practically an equivalent sum in equipment. Contract has been awarded to the C. R. Meyer & Sons Construction Co., Oshkosh, Wis., for a three-story reinforced concrete pulp mill, 75 x 150 ft. The pulp mill at Pixley will be converted into a hydroelectric generating plant when the new pulp mill is finished.

The Hamacheck-Bleser Buick Co., Manitowoc, Wis., has let the general contract to Edward & Herman & Co., local, for a garage, sales and service building, 50 x 140 ft., part two stories and basement. The machine shop will occupy an area of 50 x 55 ft. and will require a full complement of tools and fixtures.

The A. H. Petersen Mfg. Co., 1614-1624 Fratney Street, Milwaukee, manufacturer of electric portable drills and similar specialties, has incorporated its business with an authorized capitalization of \$500,000. The incorporators are Arno H. Petersen, founder and principal owner of the business; Mrs. Louise Petersen, and Arnold J. Petri, who has been office and business manager since the concern was established.

The Usteam Pressure Cooker Co., Milwaukee, has been incorporated by E. C. Bayerlein, J. A. Brauer and James T. Drought, attorney, 97 Wisconsin Street, to manufacture high pressure steam cooking devices and other appliances for domestic use. The capital stock is \$200,000. Definite details of the enterprise will be issued shortly.

## Cleveland

CLEVELAND, May 8.

Machine-tool manufacturers are getting a number of orders for single machines, sales being well scattered among various industries. Orders for single machines and small lots continue to come from the brass industry and automobile manufacturers. The trade is closely watching the automobile field, expecting more buying by car builders if sales hold up. Two automobile companies are planning extensions in case their business continues good through May and if these are carried out considerable equipment will be required. The Allyne-Zeder Motors Co., which will be formed in Cleveland as a reorganization of the Cleveland Tractor Co., is expected to require considerable equipment to manufacture motor cars, but information has been given out that its machinery requirements can not be lined up for two or three months. A local manufacturer of turret lathes reports April sales approximately double those of March. This company during the week sold a turret lathe in France, which was the first order from that country in over 18 months.

Local dealers report the market a little quieter the past week. The largest inquiry about to be closed is from southern Ohio for several machines aggregating about \$14,000.

Further details have been announced regarding the organization of the Allyne-Zeder Motors Co., Cleveland,

which will be formed with a re-organization of the Cleveland Tractor Co., and will manufacture six cylinder automobiles in addition to tractors. No plans have been announced as to what extensions will be made to the present works of the Cleveland Tractor Co. It is stated that approximately \$5,000,000 will be added to the assets of the Cleveland Tractor Co., forming a corporation with a capital stock of \$10,000,000 preferred stock and 200,000 shares of no par common stock. Clement Studebaker, Jr., will be chairman of the board, and other officers will be Rollin H. White, president; R. I. Hodgkins and George M. Studebaker, vice-presidents; George K. Knobloch, vice-president and works manager; F. M. Zeder, vice-president and chief engineer; C. D. Fleming, treasurer, and E. B. Wilson, general sales manager.

The Lincoln Tractor Co., Urbana, Ohio, has purchased the plant of the Dauch Mfg. Co., Sandusky, Ohio, and will equip it for the manufacture of farm tractors. The company has a capital stock of \$1,000,000. R. T. Parish is president and general manager.

The Towmotor Co., Cleveland, has just received a cable order for one of its tractors for shipment to Mauritius, located in the Indian Ocean. It has recently received two other orders for motors for shipment to the Far East, four going to Hong Kong and two to Penang.

The Mason Tire & Rubber Co., Akron, Ohio, will install additional machinery to double, approximately, the present output. D. M. Mason is general manager.

The Seneca Wire Co., Fostoria, Ohio, is planning for the erection of an addition to cost about \$250,000, including machinery.

In correction of an item published in THE IRON AGE of April 13, the H. B. Young Motor Truck Co., Geneva, Ohio, advises that the equipment of the Simplicity Products Mfg. Co. was not bought by that company but by the Motor Utilities Co. of Geneva and has been moved to the plant of the Young company at Geneva, where it will be used for the manufacture of various products for the Motor Utilities Co.

## Detroit

DETROIT, May 8.

The Kermath Mfg. Co., 5880 Commonwealth Avenue, Detroit, manufacturer of marine engines, has completed plans for an addition, two stories, 35 x 60 ft. J. H. G. Steffens, 3729 Cass Avenue, is architect.

A vocational department will be installed in the new two-story high school to be erected at New Haven, Mich., estimated to cost about \$150,000, for which bids are being asked until May 15. B. E. Mills, 74 West Adams Street, Detroit, is architect.

The General Motors Corporation, Pontiac, Mich., will build a four-story addition to the local GMC motor truck plant, designed to increase the capacity from 35 to about 100 trucks per day.

The Detroit Edison Co., Detroit, is completing plans for the erection of a new generating unit at its plant on the Huron River, near Ann Arbor, Mich., estimated to cost about \$50,000, exclusive of equipment. Gardner S. Williams, Cornwell Building, Ann Arbor, is consulting engineer.

Motors, automatic machinery, mechanical draft apparatus, conveying machinery and other equipment will be installed in the proposed two-story addition to be erected at the box plant of A. Backus, Jr., & Sons, 1533 West Lafayette Street, Detroit, estimated to cost about \$225,000, with machinery.

A vocational department will be installed in the new three-story high school to be erected at Reed City, Mich., for which plans are being prepared by J. N. Churchill, Oakland Building, Lansing, Mich., architect.

## The Central South

ST. LOUIS, May 8.

The American Cartridge Co., 308 West Sixth Street, Kansas City, Mo., has leased the one-story building, 50 x 150 ft., to be erected by the Campbell Estate, Sterling Building, for a new plant.

A vocational department will be installed in the two-story and basement high school to be erected at Flat River, Mo., estimated to cost about \$110,000. J. H. Felt & Co., 800 Grand Avenue, Kansas City, Mo., are architects.

The Leggett & Platt Spring Bed & Mfg. Co., Carthage, Mo., is planning the erection of an addition estimated to cost about \$50,000. C. B. Platt is general manager.

The Packard Motor Car Co. of Missouri, Twenty-fifth and McGee streets, Kansas City, Mo., will equip a new machine and repair shop at its plant. A list of equipment is being arranged. T. H. Smith is in charge.

The Schurk Iron Works, 12-20 South Cardinal Street, St.

Louis, has tentative plans for the establishment of a new branch plant at Columbia, Mo., for the manufacture of dredges, steam shovels and other heavy machinery, and parts.

The Kansas City Light & Power Co., Fourteenth and Grand avenues, Kansas City, Mo., will build a new one-story and basement power house, 50 x 140 ft. Plans have been completed.

The City Commission, Carrollton, Ky., is planning for improvements at the municipal electric power plant, to include the installation of a new generator and other auxiliary equipment. J. W. Nash is city manager.

The Louisiana & Arkansas Railway Co., Stamps, Ark., is planning to rebuild its car and machine repair shops, lately destroyed by fire. The new buildings with machinery are estimated to cost in excess of \$200,000. E. F. Salisbury is chief engineer.

The Rose City Cotton Oil Mill, North Little Rock, Ark., is planning to rebuild its works, destroyed by fire April 20, with loss estimated at \$50,000, including machinery. The new plant will cost approximately a like amount. A. Kahn is manager.

A vocational department will be installed in the two-story and basement high school to be erected at Maplewood, Mo., estimated to cost \$150,000. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Board of Directors, Northeast Missouri State Teachers' College, Kirksville, Mo., will remodel the power house and install considerable new equipment. R. H. Sanneman, 519 Lee Building, Kansas City, Mo., is architect.

The American Grain Shocker Co., Miami, Okla., manufacturer harvesting machinery, etc., is considering the establishment of a branch plant at Muskogee, Okla. Harry Barn-dollar is general manager.

The Sinclair Crude Oil Co., Tulsa, Okla., will make extensions and improvements in its plant, including a new steam power station, pumping equipment, steel storage tanks, etc.

The City Council, Carter, Okla., is completing plans for a municipal electric power plant and distributing system. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are engineers.

The Great Western Mfg. Co., Leavenworth, Kan., manufacturer of machinery and parts, has preliminary plans for a two-story and basement addition. W. P. & M. K. Feth, Leavenworth, are architects.

The Grace Sign & Mfg. Co., St. Louis, manufacturer of steel signs, has acquired property at Victor and Second streets, 150 x 205 ft., as a site for a new plant totaling about 50,000 sq. ft. of floor space and estimated to cost about \$110,000, with equipment. Paul R. Grace heads the company.

A vocational department will be installed in the new high school to be erected at Stilwell, Okla., the estimated cost of which is close to \$100,000. M. T. Hardin, 503 Equity Building, is architect.

The City Commission, Lawrenceburg, Tenn., is planning for the installation of additional machinery at its light and power plant, including water wheels, generator and auxiliary electric machinery. It is estimated to cost in excess of \$50,000. E. P. Nixon is superintendent.

Following the installation of air compressors, gas engines and auxiliary machinery at the new plant of the Phillips Petroleum Co., Bartlesville, Okla., at Shidler, Okla., now in course of erection, it is planned to duplicate the present installation at an early date, bringing the investment close to \$1,000,000.

A vocational department will be installed in the new two-story high school to be erected at Pauls Valley, Okla., estimated to cost \$100,000. Jewel Hicks, 19½ West Main Street, Oklahoma City, Okla., is architect.

## The Gulf States

BIRMINGHAM, May 8.

The American Iron & Metal Co., 2215 Latimer Street, Dallas, Tex., recently organized with a capital of \$75,000, has awarded contract to Mote & Everett, Dallas, for a new one-story plant to manufacture iron and heavy metal products. Richard H. Nathan is secretary and treasurer.

J. A. Jackson, Pioneer, Tex., is planning for the immediate erection of a municipal electric light and power house. A company will be formed to operate the plant.

The Southwest Pulp & Paper Co., 206 Broadway, Norwich, Conn., will open bids early in June for its new pulp and paper mill at Monroe, La. A power house also will be erected, and bids for the equipment and other machinery will be asked early in July. The works will cost approximately \$250,000. Joseph G. Mayo is president and manager.

The Common Council, Texline, Tex., will commence the immediate construction of a municipal electric power plant and distributing system. E. W. Baker, Oklahoma City, Okla., is engineer. H. H. Tate is city manager.

The Newell Construction Co., Birmingham, has acquired the local plant of the Southern Bridge Co., manufacturer of structural steel products, and plans to begin operations at an early date for a similar line of production. Extensions and improvements will be made and new equipment installed.

A vocational department will be installed in the new high school to be erected at Claude, Tex., for which plans have been prepared by Guy A. Carlander, Amarillo, Tex., architect.

The City Council, Quincy, Fla., is arranging a bond issue of \$98,000, about \$50,000 of which will be used for extensions and improvements in the municipal light and power plant.

The City Council, Lafayette, La., has plans under way for the erection of an addition to the municipal electric power plant. New equipment will be installed.

A vocational department will be installed in the new high school to be erected at Bessemer, Ala., estimated to cost about \$200,000. M. J. Brooks, president of the Board of Education, is in charge.

The Vulcan Rivet Co., Tarrant City, Ala., is planning for enlargements and will establish a department for the manufacture of spikes, steel tie plates and other specialties. W. C. Martin is head.

The Common Council, Clermont, Tex., has authorized the immediate enlargement of the municipal electric plant, to include the installation of new equipment.

A vocational department will be installed in the new junior high school to be erected at Wichita Falls, Tex., estimated to cost in excess of \$200,000.

The City Council, Rayne, La., is planning for extensions and improvements in the municipal electric power plant. A new engine, generator, switchboard and auxiliary equipment will be installed. E. J. Bartrand is superintendent.

A vocational department will be installed in the two-story and basement high school to be erected at Bradentown, Fla., by the Manatee County Board of Public Instruction, estimated to cost about \$90,000.

## Indiana

INDIANAPOLIS, May 8.

The Northern Indiana Gas & Electric Co., Hammond, Ind., is disposing of a bond issue of \$7,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. C. H. Geist is president.

A vocational department will be installed in the new two-story and basement high school to be erected at Wabash, Ind., estimated to cost about \$250,000. Kopf & Wobling, 403 Indiana Pythian Building, Indianapolis, are architects.

A vocational department will be installed in the new two-story high school to be erected at North Manchester, Ind., estimated to cost about \$150,000. C. R. Weatherhogg, Citizens' Trust Building, Fort Wayne, Ind., is architect.

The New York Car Wheel Co., 43 Cedar Street, New York, has purchased about 15 acres at Hammond, Ind., as a site for new works. Plans will be prepared for the initial group of buildings, designed to give employment to about 300 men and estimated to cost in excess of \$200,000, including machinery. F. P. Cooley is president.

Ovens, electric motors and other power equipment, conveying machinery, etc., will be installed in the new four-story plant to be erected by the Craig Biscuit Co., 115 Montgomery Street, Fort Wayne, Ind., estimated to cost in excess of \$85,000. The McCormick Co., Inc., 41 Park Row, New York, is architect and engineer. G. L. Scheffler is president.

## Cincinnati

CINCINNATI, May 8.

The market generally is quiet and some manufacturers who had booked a fair amount of orders the first three months of the year state that April was the slowest month since last November. The Delco Light Co., Dayton, Ohio, bought six drilling machines the past week and the St. Louis & San Francisco Railroad also purchased about 10 miscellaneous tools. The Big Four Railroad will probably close this week on a number of machines for its Kankakee shops. The Maxwell Motor Car Co., which recently issued a list of wood-working machines, is expected to be a purchaser in the near future as both plants at Dayton are operating at capacity and have booked an order for \$1,000,000 worth of closed car bodies. Small tools generally are in fair demand, but the bulk of the business placed continues to be for used tools.

Bids will be taken about May 15 for the new works of the Fay & Egan Co., wood-working machinery manufacturer, in the Bond Hill section of Cincinnati. The plant and equipment will cost about \$750,000 and work will be rushed in order to have manufacturing operations commence as close to the new year as possible.

The Schott Brothers Realty Co., Cincinnati, owner of the Cincinnati Galvanizing Co. and a number of other industries, has purchased the accessory plant of the Baldwin Piano Co., Cincinnati, and is making alterations with a view to equipping it as a power house. Plans have not been definitely completed, but it is understood that eventually the industries controlled will all be housed at the new location.

The Murphy Valve Co., with offices at 305 Majestic Building, Columbus, Ohio, has been incorporated with a capitalization of \$50,000 to manufacture a new type of valve. For the present the company will have its products manufactured by the Columbus Gas Engine & Machine Co. Paul R. Good is president, and Walter S. Jones, secretary.

The Truscon Steel Co. has been awarded contract for the erection of the new foundry of the Sterling Stove Co., Portsmouth, Ohio. It will be 140 x 154 ft., one story, and will be ready for operation about June 15.

## The Pacific Coast

SAN FRANCISCO, May 2.

The City Refrigerator & Fixture Co., 1836 East Thirty-seventh Street, Los Angeles, manufacturer of refrigerating apparatus, etc., has had plans prepared for a new one-story factory on East Thirty-seventh Street, 40 x 135 ft. O. M. Warner, 220 Stimson Building, is architect.

The State Highway Commission, Sacramento, Cal., will soon call for bids for two additional units to its automobile and motor truck repair plant, estimated to cost about \$150,000, including equipment. The first plant unit was completed recently at a cost of about \$75,000.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, will establish a machine and repair plant at Davis, Yolo County, for automobiles and motor trucks. Machine tools and other equipment will be installed at an early date.

The Santa Fe Railroad Co., Los Angeles, has plans nearing completion for a new power house at San Bernardino, Cal., 81 x 105 ft., estimated to cost about \$100,000. The engineering department, Kerckhoff Building, is in charge.

An ice-manufacturing and refrigerating plant will be installed in the new plant to be erected by the Globe Ice Cream Co., Los Angeles, at Jefferson and Hill streets, estimated to cost about \$400,000.

The Jet Oil Co., National City, Cal., has acquired a site and has plans under way for a new refinery. The initial unit is estimated to cost about \$60,000 and will be used primarily for lubricating oil manufacture.

The Los Angeles Railway Co., Pacific Electric Building, Los Angeles, has plans under way for a new one-story power house, 45 x 60 ft., to cost approximately \$35,000.

The Municipal Electric Bureau, Los Angeles, is completing plans for a power house at Harbor Boulevard and Regan Street to cost about \$300,000, of which about \$150,000 will be expended for electrical and other machinery.

The Southern California Edison Co., Los Angeles, is planning for the erection of a new power house at Virginia and Venezia avenues, Venice.

The Ord Ice Co., Santa Barbara, Cal., is planning for the erection of a new ice-manufacturing plant at Ventura, Cal., to cost about \$50,000. A site has been selected.

A vocational department will be installed in the new junior high school to be erected at Richmond, Cal., estimated to cost about \$200,000.

The Hartford Windshield Co., Los Angeles, has acquired property on Los Angeles Street and plans for the erection of a new two-story factory.

A vocational department will be installed in the new high school to be erected at Wallowa, Ore., estimated to cost in excess of \$55,000.

The Oregon Door Co., Sellwood, Ore., has work under way on an addition and will completely electrify the entire plant. The work is estimated to cost about \$100,000.

The Capital Ice & Cold Storage Co., Salem, Ore., is taking bids for its new ice and cold storage plant, estimated to cost about \$75,000, including machinery.

The Portland Railway, Light & Power Co., Portland, Ore., will make extensions and improvements in its electric power

plants and system to cost about \$500,000, including equipment.

## Canada

TORONTO, May 8.

A fair amount of machine tool business is being done in this market. The call for new lines has increased considerably the past month and one dealer states that 50 per cent of his orders were for new machines. Second-hand equipment continues active, but new machinery and tools are replacing used equipment in the present demand. While an occasional buyer is making purchases for a new plant or for additions, most of the present business is for replacement purposes and dealers state that practically the whole demand for equipment is made up of buyers who need one or two machines. Dealers experienced a slight increase in the demand for machinery during April over that of the previous month. Many factories are under construction but so far have not advanced to the stage where those interested consider it advisable to enter the market for equipment. The demand for small tools is making progress and dealers report very good sales sheets for the past month. While no change is announced in prices, quotations are being shaded when a desirable order is in prospect.

The Canadian Crocker Wheeler Co., St. Catharines, Ont., is in the market for a 7-foot radial drill.

Considerable damage was done to the plant of the Crowe Iron Works, Guelph, Ont., when a section of the main foundry was wrecked by fire. Repairs will begin immediately and some new equipment will be required. No serious delay, however, will take place in the company's activities.

The Steel Co. of Canada, Ltd., Hamilton, Ont., is in the market for a 150,000 or 200,000 lb. capacity testing machine.

The newly organized Hochelaga Cement Co., Ltd., Montreal, will erect a plant on its property in Montreal East, to have a capacity of 2500 bbl. per day. Provisions for further extensions will also be made.

The Hespeler Novelty Mfg. Co., Tara, Ont., will build an extension and install additional equipment.

The Town Council, Emerson, Ont., proposes to install an electric lighting plant and system at a cost of \$10,000. L. H. Ashby is clerk.

The Town Council, Vernon, B. C., will construct a hydro-electric plant at Shuswap Falls, B. C., to cost \$25,000.

Bids will be received until May 16 by C. Alfred Maguire, mayor and chairman of the Board of Control, Toronto, for a 4,000,000 gal. centrifugal pump.

Plans are being prepared for a factory for the Prestolock Co. of Canada at Wallaceburg, Ont., to cost \$10,000.

R. Chestnut & Sons, Queen Street, Fredericton, N. B., will erect a canoe factory to cost \$40,000.

## Trade Changes

The Gerson Rolling Mill Co., Birmingham, Ala., has changed its firm name to the Gerson Iron Co.

Lewis Thompson & Co., Inc., Philadelphia, has changed its address from the Colonial Trust Bldg. to Forty-ninth and Botanic streets, Philadelphia.

The Alaskan Steel Co., Chicago, representing Brown & Co., Inc., Pittsburgh, and Heller Brothers Co., Newark, N. J., has moved from 28 East Jackson Boulevard to 11 South Desplaines Street, Chicago.

The Donahue Steel Products Co., Chicago, forging, bolt and nut machinery and agent for the Automatic Transportation Co., Buffalo, has moved from the Peoples Gas Bldg. to 202-204 North Jefferson Street, Chicago.

The National Steel Co., Chicago, has changed its address from 111 West Washington Street to 1319-1323 Kingsbury Street, Chicago.

The Albert & Davidson Corporation, Brooklyn, N. Y., has changed its name to the Albert & Davidson Pipe Corporation, Brooklyn, N. Y.

The Technical Publicity Co. (Bissell & Land, Inc.), Pittsburgh, has moved its offices to 337-339 Second Avenue, Pittsburgh.

The American Air Compressor Works, has consolidated its New York office, 26 Cortlandt Street, with the main office at the factory, 558-562 Hamilton Avenue, Brooklyn.

The Mott Sand Blast Co., Inc., Chicago, has moved its plant from 24 South Clinton Street to 3105-11 West Twenty-seventh Street, Chicago.

The Reeves Pulley Co., Columbus, Ind., announces that the manufacture and sale of the Reeves centerless roll grinder will now be carried on at the office and factory at

Columbus, instead of through a general sales agency as heretofore.

The offices of the Republic Carbon Co., including the sales office, have been moved to Milwaukee, Wis. The plant, of course, remains at Niagara Falls, the only change being that of concentrating the executive forces in one office.

The name of the Wayne Oil Tank & Pump Co., Fort Wayne, Ind., has been changed to Wayne Tank & Pump Co. The change was found advisable in view of the recent purchase of the Borromite Co. of America by the Wayne Oil Tank & Pump Co. The Borromite Co. of America formerly controlled the patent rights and sold Borromite water softening systems. These will be marketed hereafter under the name Wayne water softening systems.

Robert W. Hunt & Co. have new offices and laboratories in the Dodge Building, 53 Park Place, West Broadway and Murray Street, New York.

The Dodge Sales & Engineering Co., Mishawaka, Ind., manufacturer of power transmission appliances and heavy oil engines, announces the removal of its New York branch from 21 Murray Street to the new Dodge building, located at Park Place, West Broadway and Murray Streets and known as 53 Park Place. The new Dodge building is 12 stories and is of steel and concrete construction, modern in every detail.

Arthur M. Watkins, dealer in machine tools, eastern agent for the Covington Machine Co. and New York agent for American Tool Works' planers and Ohio Machine Tool Co.'s shapers, has removed his offices from 165 Broadway to the Dodge Building, 53 Park Place, New York City.

The Williams Tool Corporation, pipe cutters, etc., Erie, Pa., has acquired the bolt cutter machine business of the Foote-Burt Co. of Cleveland. This acquisition includes all of the inventory, tools, patterns, fixtures, equipment and good will pertaining to the "Reliance" bolt cutter. A complete line of power threading machines will now be developed and presented as Williams products.

The William W. Orr Co., sales agent in western Pennsylvania, West Virginia and eastern Ohio for the Mueller Metals Co., Port Huron, Mich., has removed from 1635 Oliver Building, Pittsburgh, to 2404 First National Bank Building, that city.

A new entrant in the machinery business at San Francisco is the Pacific Coast Machinery Co. H. Welshaupt is president, formerly being part owner of the California Machinery Co. W. A. Folger, for several years of the Pacific tool supply division of the Berger & Carter Co., is associated with Mr. Welshaupt in the handling of used and new iron and wood-working machinery and allied equipment.

The Canton Pneumatic Tool Co., Canton, Ohio, now has a sales office at 27 Warren Street, New York.

The S. Obermayer Co., Pittsburgh, Pa., maker of a brass deoxidizer, foundry equipment and supplies, has changed its address to 2563 West Eighteenth Street, Chicago.

Albert & Davidson, Inc., Brooklyn, N. Y., has changed its name to the Albert & Davidson Pipe Corporation, Brooklyn, N. Y.

The August Mietz Corporation, New York, oil engines, has changed its name to the Reliance Engine Corporation, New York.

The Debevoise-Anderson Co., pig iron, coal, coke and ore, has changed its address from 56 Liberty Street to 114 Liberty Street, New York.

The Channon-Dangel Co., screw machine products, Chicago, has changed its name to the Dunne-Hartnett Foundry, Chicago.

The American Air Compressor Works, 26 Cortlandt Street, New York, has changed its address to 553 Hamilton Avenue, New York.

The Vandyek-Churchill Co., cold metal saws, formerly in the Singer Building, is now located at 52 Vesey Street, New York.

The Ohio Wire Goods Mfg. Co., stampings, specialties, etc., Akron, Ohio, has changed its name to the Ohio Metal Stamping & Mfg. Co., and its address from 964 Hasel Street to 816 East Market Street, Akron, Ohio.

The Karge System, Inc., flexible couplings, Phoenix, N. Y., while maintaining its Phoenix factory for the manufacture of couplings, has moved its general offices to Buffalo, where, it is understood, it will manufacture small refrigerating units.

The Stamford Rolling Mills Co., non-ferrous sheets, wire, etc., Springdale, Conn., has changed its New York address to 347 Madison Avenue.

Frank N. Adgate, Western sales manager for the Lancaster, Pa., Steel Products Corporation, with offices in General Motors Building, Detroit, announces a change in method of distribution. Perrine & Maloney, Railway Exchange Build-

ing, Chicago, have been appointed to handle the Chicago district, and the Maynard French Steel Co., Mercantile Library Building, Cincinnati, has been selected for that territory. Additional appointments are to be announced.

## Plans of New Companies

The Stacks Engineering Co., Hartford, Conn., special machinery for steel testing, will have its manufacturing done by contract. Its plans are not yet complete.

The New England Tube & Stamping Co., Inc., is successor to the Coe-Stapley Mfg. Corp., West Haven, Conn. It is located in the building formerly occupied by the Coe-Stapley Mfg. Corporation, and has sufficient equipment on hand for its immediate use.

The Koalest Products Co., 15 Exchange Place, Jersey City, N. J., has been incorporated with Richard L. Tyner, of the Home Insurance Co., as president. It has acquired the patents and will manufacture and market a burner using kerosene or distillate for fuel, as well as other oil burning appliances, at a plant which it has recently taken over in New York. Contracts will be entered into for small tanks, valves and burner castings. The company will do its own machine work and assembling.

The Grant-Holub Co., a new corporation, has been organized at Buffalo Boulevard and Doremus Street, Detroit, with H. S. Grant, president, and Harry Alvin, vice-president, both of the Grant Iron & Metal Co., and David C. Holub, secretary and treasurer, of the American Scrap Iron Co., Akron, Ohio, have opened a scrap iron yard in Canton, Ohio. It is equipped with a locomotive crane and shears, located on the W. & L. E. R. R. The new company is affiliated with the Grant Iron & Metal Co., Detroit, and the American Scrap Iron Co., Akron.

Mu-Rad Laboratories, Inc., Asbury Park, N. J., has been organized for the manufacture of radio receiving equipment. It is at present concentrating on the production of radio frequency amplifier transformers, parts for which are being manufactured on contract by other companies, but some of the manufacturing is done in the company's own shop.

The International Blower Co., Inc., Hartford, Conn., has purchased the business, machinery, tools and equipment of the Connecticut Blower Co. of that city. It has leased manufacturing space at 345 Trumbull Street, and the machinery is nearly installed. The products are blowers, exhaust fans, ventilating fans, blower and exhaust systems, ventilating systems, fan systems of heating and ventilating and sheet metal work.

McArdle & Walsh, Inc., Key Highway at Boyle Street, Baltimore, is composed of the same people as the former McArdle & Cooney, and is simply an incorporation of the former concern. It is a jobber in wrought steel pipe, valves and steam specialties.

The Evercold Corporation, 5628 McGraw Avenue, Detroit, has been formed for the purpose of manufacturing automatic electric refrigerating units for use in the home. Most of the assembling equipment has been purchased and installed. The work is being done by contract, and plans for the next 30 days are to release materials sufficient to assemble 1000 units. It is expected that within 60 days the company will be in quantity production.

The International Steel Products Co., Hartford, Wis., has been re-organized into a new corporation under the name of the International Stamping Co. The corporation has been refinanced by some of the members who were in the old, providing ample capital to continue in the manufacturing of mufflers and automobile specialties; also, some electrical wireless specialties.

The Snapp Hair Curlier Corporation, New York, has made arrangements to manufacture its metal hair curlier by contract at the works of the Advanced Metal Stamping Company, 17 Thompson Street, New York.

The Steel-Flex Coupling Corporation has been incorporated for \$250,000 under the laws of Michigan. General offices are at 1712 First National Bank Building, Detroit. The officers are: Norman Pearson, president and treasurer; Sidney R. Teasdale, vice-president; Frederick O. Breed, secretary; J. W. W. Ow, chief engineer. The corporation will manufacture cushion flexible couplings for power transmission, permitting of misalignment between shafts and with exceptional shock absorbing qualities. Contracts will be let for helical shaped coils of rectangular steel, machine steel parts, and small to medium steel castings of high grade.

The Southern Draft Regulator Co., Greenville, S. C., is having its draft regulators manufactured and expects to do its own manufacturing later. W. C. Willis is treasurer.

The Rochester Chandelier Co., Inc., Rochester, N. Y., does not intend to build for the present, but may be in the market for buffing machinery, stampings, etc.

# Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

## Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined iron bars, base price.....	2.48c.
Swedish bars, base price.....	10.00c.
Soft steel bars, base price.....	2.48c.
Hoops, base price.....	3.38c.
Bands, base price.....	2.98c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base.....	2.58c.
Channels, angles and tees under 3 in. x	
¼ in., base.....	2.48c.

## Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger.....	2.50c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)...	2.70c.
Toe-calk, ½ x ¾ in. and larger.....	3.20c.
Cold-rolled strip, soft and quarter hard..	6.25c. to 7.25c.
Open-hearth spring steel.....	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds.....	3.35c.
Squares, flats and hex.....	3.85c.
Standard cast steel, base price.....	12.00c.
Extra cast steel.....	17.00c.
Special cast steel.....	22.00c.

## Tank Plates—Steel

¼ in. and heavier.....	2.58c.
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## Sheets

### Blue Annealed

	Per Lb.
No. 10.....	3.38c. to 3.53c.
No. 12.....	3.43c. to 3.58c.
No. 14.....	3.48c. to 3.63c.
No. 16.....	3.53c. to 3.73c.

### Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Srove Pipe Sheet, Per Lb.
Nos. 18 to 20.....	3.80c. to 4.05c.	.....
Nos. 22 and 24.....	3.85c. to 4.10c.	4.25c.
No. 26.....	3.90c. to 4.15c.	4.30c.
No. 28.....	4.00c. to 4.25c.	4.40c.
No. 30.....	4.25c. to 4.50c.	.....
No. 28 and lighter, 36 in. wide, 10c. higher.		

## Galvanized

	Per Lb.
No. 14.....	4.10c. to 4.35c.
No. 16.....	4.25c. to 4.50c.
Nos. 18 and 20.....	4.40c. to 4.65c.
Nos. 22 and 24.....	4.55c. to 4.80c.
No. 26.....	4.70c. to 4.95c.
No. 27.....	4.85c. to 5.10c.
No. 28.....	5.00c. to 5.25c.
No. 30.....	5.50c. to 5.75c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

## Welded Pipe

Standard Steel			Wrought Iron		
	Black	Galv.		Black	Galv.
½ in. Butt....	—56	—40	¾ in. Butt....	—30	—13
¾ in. Butt....	—61	—47	1½ in. Butt....	—32	—15
1-3 in. Butt....	—63	—49	2 in. Lap....	—27	—10
3½-6 in. Lap....	—60	—46	2½-6 in. Lap....	—30	—15
7-8 in. Lap....	—56	—34	7-12 in. Lap....	—23	—7
9-12 in. Lap....	—55	—33			

## Steel Wire

	Per Lb.
Bright basic.....	3.50c. to 3.75c.
Annealed soft.....	3.50c. to 3.75c.
Galvanized annealed.....	4.25c. to 4.50c.
Coppered basic.....	4.00c. to 4.25c.
Tinned soft Bessemer.....	5.50c. to 5.75c.

\*Regular extras for lighter gage.

## Brass Sheet, Rod, Tube and Wire

### BASE PRICE

High brass sheet.....	16 c. to 16½c.
High brass wire.....	16½c. to 17 c.
Brass rod.....	13½c. to 14½c.
Brass tube, brazed.....	22½c. to 23 c.
Brass tube, seamless.....	18 c. to 19 c.
Copper tube, seamless.....	20½c. to 21½c.

## Copper Sheets

Sheet copper, hot rolled, 24 oz., 19¼c. to 20¼c. per lb. base.	
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.	

## Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14-20	Primes Wasters
	IC..	\$10.00	\$8.50	80 lb.. \$6.05 \$5.80
	IX..	11.50	10.00	90 lb.. 6.15 5.90
	IXX..	13.00	11.25	100 lb.. 6.25 6.00
	IXXX..	14.25	12.50	IC.. 6.40 6.15
	IXXXX..	16.00	14.00	IX.. 7.40 7.15
				IXX.. 8.40 8.15
				IXXX.. 9.40 9.15
				IXXXX.. 10.40 10.15

## Terne Plates

8-lb. coating 14 x 20	
100 lb.....	\$7.00
IC.....	7.25
IX.....	7.50
Fire door stock.....	9.00

## Tin

Straits, pig.....	33½c.
Bar.....	40c. to 44c.

## Copper

Lake ingot.....	15 c.
Electrolytic.....	14½c.
Casting.....	14½c.

## Spelter and Sheet Zinc

Western spelter.....	6½c. to 7c.
Sheet zinc, No. 9 base, casks.....	9c. open 9½c.

## Lead and Solder\*

American pig lead.....	6½c. to 6¾c.
Bar lead.....	7 c. to 7¼c.
Solder, ½ and ½ guaranteed.....	23c.
No. 1 solder.....	21½c.
Refined solder.....	18c.

\*Prices of solder indicated by private brand vary according to composition.

## Babbitt Metal

Best grade, per lb.....	75c.
Commercial grade, per lb.....	35c.
Grade D, per lb.....	25c.

## Antimony

Asiatic.....	6½c. to 7c.
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## Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	25c. to 27c.
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## Old Metals

Prices are higher and inquiry is good. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible.....	10.75
Copper, heavy wire.....	10.25
Copper, light and bottoms.....	8.25
Brass, heavy.....	5.50
Brass, light.....	4.50
Heavy machine composition.....	7.75
No. 1 yellow brass turnings.....	5.25
No. 1 red brass or composition turnings.....	6.75
Lead, heavy.....	4.25
Lead, tea.....	3.00
Zinc.....	2.50

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